Round Test 2020-1 on

Stickiness Characterization Methods

- FINAL REPORT –

date: August 27, 2020

Stickiness Task Force of the 'International Committee on Cotton Testing Methods' (ICCTM) of the 'International Textile Manufacturers Federation' (ITMF)

Gourlot Jean-Paul [(1)]
Drieling Axel [(2)]
Froese Karsten [(3)]
Lassus Serge [(1)]

[(1)] CIRAD, France, [(2)] FIBRE, Germany, and [(3)] ICA Bremen, Germany

Contents

Round Test on stickiness characterization 2020-1

- FINAL REPORT -

data: August 28, 2020

Stickiness Task Force of the 'International Committee on Cotton Testing Methods' (ICCTM) of the 'International Textile Manufacturers Federation' (ITMF)

Gourlot Jean-Paul (1)

Drieling Axel (2)

Froese Karsten (3)

Lassus Serge (1)

(1) CIRAD, France, (2) FIBRE, Germany, and (3) ICA Bremen, Germany

Introduction

Confidentiality and use of information from this report

This report is both public and confidential:

- It is public as it will be released on the internet website of the ITMF (www.itmf.org) without providing any private information.

- It also is confidential as we provide Participating Laboratories with their own confidential laboratory LabID code that gives access to understanding each piece of information of the report; indeed with this LabID code number, more information can be extracted from the report. Please note that this LabID is changed for each test.

The Authors will not be held responsible to any degree for dissemination of the LabID code after the confidential distribution of their LabID code to the participating laboratories.

Gourlot Jean-Paul, Drieling Axel, Froese Karsten, Lassus Serge. 2020. Round Test 2020-1 on stickiness characterization methods - Final report. Montpellier : CIRAD-ITMF, 120 p.

Preparation of cottons and samples

A range of five cottons was selected for their stickiness potential range. Basically, the stickiness level of these cottons is not known a priori and their level is being better known after the test, expecting that these cottons cover a range of stickiness.

All cottons in this test got a similar level of homogenization using an homogenizing machine developed during CFC/ICAC/33 project 'CSITC' project (so called CSITC homogenizing machine). The main goal of this preparation is to ensure that any drawn sample from the original mass would carry the "same" stickiness potential as any other sample for evaluating the laboratory performance, but without affecting too much the size of individual sticky points that could affect some measurement methods.

The degree of this preparation affects the distribution of sticky points within the mass of the fibers. When an homogenization is 'perfectly performed', then the sticky point distribution follows Poisson's distribution within the fibers; in other cases, sticky point distribution follows over-dispersed distributions, such as negative binomial distributions, meaning that sticky points may be 'grouped' in some parts of the material while the rest of the material remains free of stickiness. In these conditions, many repetitions of measurements are required to statistically compare laboratory performances or method performances.

From the beginning, we knew that homogenizing the cottons would induce some 'preparation', and this was several times reported to us with the results. However, this has been the only way to ensure that all samples

would be 'alike' for any given cotton in order to compare method performances or laboratory performances within methods.

Once the cottons were homogenized, samples were drawn from their original cotton mass, and sets of cottons were constituted for each participating laboratory, whatever the method used. Envelopes were sent out to laboratories in end of February 2020.

All laboratories were supposed to send their results back by June 10, 2020. Practically, this date was reported to August 24, 2020. This FINAL REPORT is prepared after this date when most Laboratories who received the material lately sent back their results.

Organizing this round-test, at present running for free, takes time and uses precious materials; therefore we really appreciate when all registered Laboratories who received RT samples provide us with results.

Organization of this report

As stated in the Contents,

- Individual results provided by Participating Laboratories are reported, cotton by cotton, sorted by method and then by LabID. A mail is sent out in a confidential manner to each participating laboratory for reading this public report, and therefore getting more out of it.

- Statistics are then presented in summary tables or in charts, cotton by cotton, sorted by method and then by LabID. This section allows the comparison of results by LabID within each method. Both the mean results and the variation of individual results are then highlighted.

- Correlation matrix are given for comparing LabID Mean results cotton by cotton, and sorted by method.

- Charts linking the within-laboratory variances of LabIDs for each method to the calculated mean results per LabID are displayed. Precision and accuracy of individual LabID performance can be deduced from these charts.

- Finally, distances between LabID mean result to the Grand Mean are displayed by method, sorted by method and by LabID.

New: The general comment on the RT results which was part of the confidential letter to the Participating Laboratories until RT2019-1 is now part of this report under the section "General conclusions about the results of this round-test" and will not be part of the indicated letter anymore.

Conversion of 'laboratories raw records' into numeric data for use in this report

Answers to this round-test were provided **freely** by laboratories in a table having five columns (one per cotton) and six lines (for potentially recording six results for each cotton) for a total of 30 table cells.

For comparing results between laboratories, results were expected to be reported in a coordinated and harmonized manner within each method. However, for this test also, laboratories reported results the way they probably are used to do in their every day practice: the observation is that the report was not always harmonized within methods.

Under necessity and for allowing a comparison, we may be obliged to convert some laboratory records into harmonized numeric values by applying the following rules when needed (most acronyms are explained in the 'Frequently asked questions' section):

- For Caramelization : one measurement = one cell. No transformation of the data.
- For Clinitest: >1: was converted into 1.5.
- For Contest and Fibermap: Since RT2018-1 included: these devices are using the same technology for characterizing stickiness and their results are grouped together into one single 'Contest-Fibermap' category. Since March 2020, Contest-S was recognized by ITMF-ICCTM, and therefore Contest-S becomes the nam of this category. No transformation of the data.
- For GB/T13785-1992: one measurement = one cell. No transformation of the data.
- For H2SD: one measurement = one cell. No transformation of the data.
- For HSI-NIR: one measurement = one cell. No transformation of the data that has been calibrated to H2SD count at the beginning.
- For KOTITI: grades were converted into numeric values as follows:
  - A: 0
  - A+ = B-: 1
  - B: 2
  - B+ = C-: 3
  - C: 4
  - C+ = D-: 5
  - D: 6
  - D+ = E-: 7
  - E: 8
  - E+: 9.
- For minicard: ITMF grades 0 to 3 were used for reporting, one measurement = one cell. No transformation of the data.

- For Qualitative:
  - NIL: 0
  - Trace: 1
  - Light: 2
- For SCT: one measurement = one record = sum of reading of top foil + reading of bottom foil.
- For TDM-A: one measurement = one record. No transformation of the data.

All individual results per Method and LabID for each cotton [1]

[1] Footnote

* Results sorted by Method and then by LabID.
* NA or NaN : no results provided.

Table for Cotton A

Meth	LabID	R1	R2	R3	R4	R5	R6	Un
Carameliza	10	3.6	3.9	NA	NA	NA	NA	Color degree
Carameliza	20	3.0	NA	NA	NA	NA	NA	Color degree
Carameliza	30	4.6	NA	NA	NA	NA	NA	Color degree
Contest-S	35	42.0	22.0	20.0	19.0	29.0	23.0	C/F Grade
Contest-S	85	113.4	71.1	63.9	59.4	73.8	68.4	C/F Grade
Contest-S	90	38.0	33.0	51.0	15.0	33.0	27.0	C/F Grade
H2SD	45	1.0	0.0	3.0	2.0	0.0	3.0	Sticky point
H2SD	50	9.0	9.0	7.0	6.0	5.0	6.0	Sticky point
H2SD	105	20.0	15.0	25.0	18.0	25.0	18.0	Sticky point
HSI-NIR	110	15.0	14.0	17.0	20.0	6.0	14.0	Sticky point
KOTITI	5	5.0	2.0	2.0	5.0	5.0	5.0	KOTITI Grade
Minicard	95	0.5	0.0	0.0	NA	NA	NA	ITMF Grade
Qualitativ	60	1.0	1.0	1.0	1.0	1.0	1.0	Grade
Quantitati	65	0.5	0.5	0.5	0.5	0.5	0.4	Percent
Quantitati	75	0.5	0.5	0.4	0.5	0.5	0.4	Percent
SCT	15	19.0	15.0	17.0	14.0	13.0	15.0	Sticky point
SCT	25	12.0	8.0	6.0	9.0	10.0	8.0	Sticky point
SCT	40	25.0	24.0	18.0	NA	NA	NA	Sticky point
SCT	55	7.0	8.0	7.0	4.0	5.0	6.0	Sticky point
SCT	70	26.0	22.0	24.0	24.0	27.0	20.0	Sticky point
SCT	80	15.0	10.0	11.0	NA	NA	NA	Sticky point
SCT	100	1.0	1.0	2.0	1.0	3.0	5.0	Sticky point

Table for Cotton B

Meth	LabID	R1	R2	R3	R4	R5	R6	Un
Carameliza	10	2.8	2.7	NA	NA	NA	NA	Color degree
Carameliza	20	2.9	NA	NA	NA	NA	NA	Color degree
Carameliza	30	3.9	NA	NA	NA	NA	NA	Color degree
Contest-S	35	615.0	502.0	306.0	341.0	185.0	188.0	C/F Grade
Contest-S	85	225.0	321.3	345.6	326.7	400.5	294.3	C/F Grade
Contest-S	90	272.0	221.0	259.0	372.0	316.0	177.0	C/F Grade
H2SD	45	26.0	12.0	16.0	25.0	31.0	16.0	Sticky point
H2SD	50	39.0	36.0	41.0	40.0	42.0	40.0	Sticky point
H2SD	105	45.0	33.0	37.0	34.0	50.0	56.0	Sticky point
HSI-NIR	110	27.0	27.0	34.0	29.0	36.0	29.0	Sticky point
KOTITI	5	8.0	8.0	9.0	8.0	8.0	9.0	KOTITI Grade
Minicard	95	2.5	1.5	1.2	NA	NA	NA	ITMF Grade
Qualitativ	60	2.0	2.0	2.0	2.0	2.0	2.0	Grade
Quantitati	65	0.5	0.6	0.7	0.7	0.8	0.8	Percent
Quantitati	75	0.6	0.8	0.8	0.8	0.6	0.8	Percent
SCT	15	49.0	42.0	41.0	43.0	44.0	46.0	Sticky point
SCT	25	44.0	48.0	41.0	45.0	54.0	50.0	Sticky point
SCT	40	35.0	37.0	31.0	NA	NA	NA	Sticky point
SCT	55	27.0	26.0	27.0	23.0	35.0	32.0	Sticky point
SCT	70	52.0	47.0	38.0	49.0	53.0	43.0	Sticky point
SCT	80	48.0	44.0	59.0	NA	NA	NA	Sticky point
SCT	100	21.0	29.0	19.0	29.0	15.0	26.0	Sticky point

Table for Cotton C

Meth	LabID	R1	R2	R3	R4	R5	R6	Un
Carameliza	10	2.3	2.5	NA	NA	NA	NA	Color degree
Carameliza	20	2.8	NA	NA	NA	NA	NA	Color degree
Carameliza	30	2.9	NA	NA	NA	NA	NA	Color degree
Contest-S	35	429.0	452.0	608.0	404.0	443.0	388.0	C/F Grade
Contest-S	85	391.5	425.7	520.2	473.4	375.3	278.1	C/F Grade
Contest-S	90	435.0	269.0	460.0	316.0	422.0	314.0	C/F Grade
H2SD	45	41.0	31.0	24.0	15.0	37.0	13.0	Sticky point
H2SD	50	41.0	45.0	52.0	41.0	32.0	45.0	Sticky point
H2SD	105	38.0	40.0	40.0	52.0	NA	NA	Sticky point
HSI-NIR	110	26.0	38.0	36.0	29.0	38.0	32.0	Sticky point
KOTITI	5	8.0	8.0	8.0	8.0	8.0	8.0	KOTITI Grade
Minicard	95	1.8	2.5	2.8	NA	NA	NA	ITMF Grade
Qualitativ	60	2.0	2.0	2.0	2.0	2.0	2.0	Grade
Quantitati	65	0.8	0.8	0.8	0.8	1.0	0.9	Percent
Quantitati	75	0.6	0.8	0.6	0.6	0.6	0.6	Percent
SCT	15	100.0	102.0	97.0	105.0	94.0	101.0	Sticky point
SCT	25	78.0	85.0	91.0	87.0	82.0	75.0	Sticky point
SCT	40	98.0	98.0	103.0	NA	NA	NA	Sticky point
SCT	55	93.0	81.0	62.0	77.0	88.0	69.0	Sticky point
SCT	70	52.0	61.0	65.0	57.0	56.0	50.0	Sticky point
SCT	80	84.0	95.0	91.0	NA	NA	NA	Sticky point
SCT	100	40.0	47.0	61.0	49.0	46.0	43.0	Sticky point

Table for Cotton D

Meth	LabID	R1	R2	R3	R4	R5	R6	Un
Carameliza	10	2.1	2.1	NA	NA	NA	NA	Color degree
Carameliza	20	2.5	NA	NA	NA	NA	NA	Color degree
Carameliza	30	3.1	NA	NA	NA	NA	NA	Color degree
Contest-S	35	193.0	77.0	175.0	67.0	143.0	52.0	C/F Grade
Contest-S	85	92.7	180.9	115.2	383.4	205.2	159.3	C/F Grade
Contest-S	90	123.0	183.0	83.0	198.0	108.0	86.0	C/F Grade
H2SD	45	6.0	2.0	2.0	2.0	3.0	2.0	Sticky point
H2SD	50	2.0	3.0	1.0	3.0	3.0	2.0	Sticky point
H2SD	105	3.0	26.0	7.0	10.0	NA	NA	Sticky point
HSI-NIR	110	5.0	12.0	13.0	5.0	10.0	17.0	Sticky point
KOTITI	5	8.0	8.0	8.0	8.0	8.0	8.0	KOTITI Grade
Minicard	95	0.8	1.5	3.0	NA	NA	NA	ITMF Grade
Qualitativ	60	1.0	1.0	1.0	1.0	1.0	1.0	Grade
Quantitati	65	0.3	0.3	0.4	0.4	0.4	0.4	Percent
Quantitati	75	0.2	0.2	0.1	0.1	0.1	0.1	Percent
SCT	15	12.0	11.0	13.0	10.0	11.0	12.0	Sticky point
SCT	25	5.0	13.0	9.0	7.0	6.0	9.0	Sticky point
SCT	40	3.0	5.0	0.0	NA	NA	NA	Sticky point
SCT	55	4.0	4.0	4.0	3.0	4.0	2.0	Sticky point
SCT	70	9.0	9.0	11.0	12.0	10.0	11.0	Sticky point
SCT	80	6.0	5.0	5.0	NA	NA	NA	Sticky point
SCT	100	0.0	1.0	0.0	2.0	3.0	1.0	Sticky point

Table for Cotton E

Meth	LabID	R1	R2	R3	R4	R5	R6	Un
Carameliza	10	2.9	2.5	NA	NA	NA	NA	Color degree
Carameliza	20	2.2	NA	NA	NA	NA	NA	Color degree
Carameliza	30	3.9	NA	NA	NA	NA	NA	Color degree
Contest-S	35	291.0	357.0	499.0	439.0	357.0	346.0	C/F Grade
Contest-S	85	347.4	375.3	291.6	464.4	364.5	339.3	C/F Grade
Contest-S	90	368.0	407.0	369.0	377.0	346.0	319.0	C/F Grade
H2SD	45	7.0	18.0	18.0	10.0	23.0	6.0	Sticky point
H2SD	50	22.0	20.0	31.0	19.0	18.0	20.0	Sticky point
H2SD	105	56.0	29.0	70.0	46.0	48.0	50.0	Sticky point
HSI-NIR	110	18.0	21.0	19.0	20.0	18.0	13.0	Sticky point
KOTITI	5	8.0	8.0	8.0	8.0	8.0	8.0	KOTITI Grade
Minicard	95	2.2	2.5	3.0	NA	NA	NA	ITMF Grade
Qualitativ	60	1.0	1.0	1.0	1.0	1.0	1.0	Grade
Quantitati	65	0.5	0.5	0.7	0.6	NA	NA	Percent
Quantitati	75	0.1	0.1	0.2	0.1	0.1	0.1	Percent
SCT	15	74.0	69.0	66.0	71.0	64.0	70.0	Sticky point
SCT	25	35.0	39.0	35.0	40.0	33.0	36.0	Sticky point
SCT	40	14.0	13.0	20.0	NA	NA	NA	Sticky point
SCT	55	34.0	61.0	55.0	36.0	54.0	33.0	Sticky point
SCT	70	38.0	38.0	32.0	44.0	35.0	36.0	Sticky point
SCT	80	40.0	39.0	45.0	NA	NA	NA	Sticky point
SCT	100	23.0	23.0	40.0	13.0	20.0	22.0	Sticky point

Statistics per Method, LabID for each cottons [2]

[2]Footnote

* Mean of all readings per LabID (NA excluded, expressed in Unit).
* Var = variance taking care of all available readings per LabID (NA excluded).
* CV = CV between reading per LabID expressed in percent.
* GMean = Grand Mean of all laboratory means, calculated by Method.
* Delta = LabID Mean - GMean.
* NA or NaN : no result provided.

Table for Cotton A

Meth	LabID	MeanIntraLab	Un	VarIntraLab	CVIntraLab	MeanInterLab	Delta
Carameliza	10	3.8	Color degree	0.0	5.7	3.8	0.0
Carameliza	20	3.0	Color degree	NA	NA	3.8	-0.8
Carameliza	30	4.6	Color degree	NA	NA	3.8	0.8
Contest-S	35	25.8	C/F Grade	75.0	33.5	44.6	-18.7
Contest-S	85	75.0	C/F Grade	380.3	26.0	44.6	30.4
Contest-S	90	32.8	C/F Grade	141.8	36.3	44.6	-11.7
H2SD	45	1.5	Sticky point	1.9	91.9	9.6	-8.1
H2SD	50	7.0	Sticky point	2.8	23.9	9.6	-2.6
H2SD	105	20.2	Sticky point	16.6	20.2	9.6	10.6
HSI-NIR	110	14.3	Sticky point	21.9	32.6	14.3	0.0
KOTITI	5	4.0	KOTITI Grade	2.4	38.7	4.0	0.0
Minicard	95	0.2	ITMF Grade	0.1	173.2	0.2	0.0
Qualitativ	60	1.0	Grade	0.0	0.0	1.0	0.0
Quantitati	65	0.5	Percent	0.0	5.5	0.5	0.0
Quantitati	75	0.5	Percent	0.0	13.5	0.5	0.0
SCT	15	15.5	Sticky point	4.7	14.0	13.0	2.5
SCT	25	8.8	Sticky point	4.2	23.1	13.0	-4.1
SCT	40	22.3	Sticky point	14.3	17.0	13.0	9.4
SCT	55	6.2	Sticky point	2.2	23.9	13.0	-6.8
SCT	70	23.8	Sticky point	6.6	10.8	13.0	10.9
SCT	80	12.0	Sticky point	7.0	22.0	13.0	-1.0
SCT	100	2.2	Sticky point	2.6	73.9	13.0	-10.8

Table for Cotton B

Meth	LabID	MeanIntraLab	Un	VarIntraLab	CVIntraLab	MeanInterLab	Delta
Carameliza	10	2.8	Color degree	0.0	2.6	3.2	-0.4
Carameliza	20	2.9	Color degree	NA	NA	3.2	-0.3
Carameliza	30	3.9	Color degree	NA	NA	3.2	0.7
Contest-S	35	356.2	C/F Grade	29717.4	48.4	314.9	41.3
Contest-S	85	318.9	C/F Grade	3372.1	18.2	314.9	4.0
Contest-S	90	269.5	C/F Grade	4738.7	25.5	314.9	-45.4
H2SD	45	21.0	Sticky point	54.4	35.1	34.4	-13.4
H2SD	50	39.7	Sticky point	4.3	5.2	34.4	5.3
H2SD	105	42.5	Sticky point	87.5	22.0	34.4	8.1
HSI-NIR	110	30.3	Sticky point	14.3	12.5	30.3	0.0
KOTITI	5	8.3	KOTITI Grade	0.3	6.2	8.3	0.0
Minicard	95	1.8	ITMF Grade	0.4	37.8	1.8	0.0
Qualitativ	60	2.0	Grade	0.0	0.0	2.0	0.0
Quantitati	65	0.7	Percent	0.0	15.3	0.7	0.0
Quantitati	75	0.7	Percent	0.0	8.0	0.7	0.0
SCT	15	44.2	Sticky point	8.6	6.6	39.2	5.0
SCT	25	47.0	Sticky point	21.6	9.9	39.2	7.8
SCT	40	34.3	Sticky point	9.3	8.9	39.2	-4.9
SCT	55	28.3	Sticky point	19.1	15.4	39.2	-10.9
SCT	70	47.0	Sticky point	32.4	12.1	39.2	7.8
SCT	80	50.3	Sticky point	60.3	15.4	39.2	11.1
SCT	100	23.2	Sticky point	33.0	24.8	39.2	-16.0

Table for Cotton C

Meth	LabID	MeanIntraLab	Un	VarIntraLab	CVIntraLab	MeanInterLab	Delta
Carameliza	10	2.4	Color degree	0.0	5.9	2.7	-0.3
Carameliza	20	2.8	Color degree	NA	NA	2.7	0.1
Carameliza	30	2.9	Color degree	NA	NA	2.7	0.2
Contest-S	35	454.0	C/F Grade	6264.4	17.4	411.3	42.7
Contest-S	85	410.7	C/F Grade	7070.2	20.5	411.3	-0.6
Contest-S	90	369.3	C/F Grade	6255.9	21.4	411.3	-42.0
H2SD	45	26.8	Sticky point	132.2	42.8	37.3	-10.5
H2SD	50	42.7	Sticky point	43.5	15.5	37.3	5.3
H2SD	105	42.5	Sticky point	41.0	15.1	37.3	5.2
HSI-NIR	110	33.2	Sticky point	25.0	15.1	33.2	0.0
KOTITI	5	8.0	KOTITI Grade	0.0	0.0	8.0	0.0
Minicard	95	2.3	ITMF Grade	0.3	22.3	2.3	0.0
Qualitativ	60	2.0	Grade	0.0	0.0	2.0	0.0
Quantitati	65	0.9	Percent	0.0	9.2	0.8	0.1
Quantitati	75	0.7	Percent	0.0	6.8	0.8	-0.1
SCT	15	99.8	Sticky point	15.0	3.9	79.3	20.5
SCT	25	83.0	Sticky point	34.8	7.1	79.3	3.7
SCT	40	99.7	Sticky point	8.3	2.9	79.3	20.3
SCT	55	78.3	Sticky point	134.3	14.8	79.3	-1.0
SCT	70	56.8	Sticky point	31.0	9.8	79.3	-22.5
SCT	80	90.0	Sticky point	31.0	6.2	79.3	10.7
SCT	100	47.7	Sticky point	52.7	15.2	79.3	-31.7

Table for Cotton D

Meth	LabID	MeanIntraLab	Un	VarIntraLab	CVIntraLab	MeanInterLab	Delta
Carameliza	10	2.1	Color degree	0.0	0.0	2.6	-0.5
Carameliza	20	2.5	Color degree	NA	NA	2.6	-0.1
Carameliza	30	3.1	Color degree	NA	NA	2.6	0.5
Contest-S	35	117.8	C/F Grade	3627.4	51.1	145.8	-28.0
Contest-S	85	189.4	C/F Grade	10744.1	54.7	145.8	43.6
Contest-S	90	130.2	C/F Grade	2422.2	37.8	145.8	-15.7
H2SD	45	2.8	Sticky point	2.6	56.5	5.6	-2.7
H2SD	50	2.3	Sticky point	0.7	35.0	5.6	-3.2
H2SD	105	11.5	Sticky point	101.7	87.7	5.6	5.9
HSI-NIR	110	10.3	Sticky point	22.3	45.7	10.3	0.0
KOTITI	5	8.0	KOTITI Grade	0.0	0.0	8.0	0.0
Minicard	95	1.8	ITMF Grade	1.3	65.5	1.8	0.0
Qualitativ	60	1.0	Grade	0.0	0.0	1.0	0.0
Quantitati	65	0.4	Percent	0.0	7.0	0.3	0.1
Quantitati	75	0.2	Percent	0.0	36.5	0.3	-0.1
SCT	15	11.5	Sticky point	1.1	9.1	6.1	5.4
SCT	25	8.2	Sticky point	8.2	35.0	6.1	2.1
SCT	40	2.7	Sticky point	6.3	94.4	6.1	-3.4
SCT	55	3.5	Sticky point	0.7	23.9	6.1	-2.6
SCT	70	10.3	Sticky point	1.5	11.7	6.1	4.2
SCT	80	5.3	Sticky point	0.3	10.8	6.1	-0.8
SCT	100	1.2	Sticky point	1.4	100.2	6.1	-4.9

Table for Cotton E

Meth	LabID	MeanIntraLab	Un	VarIntraLab	CVIntraLab	MeanInterLab	Delta
Carameliza	10	2.7	Color degree	0.1	10.5	2.9	-0.2
Carameliza	20	2.2	Color degree	NA	NA	2.9	-0.7
Carameliza	30	3.9	Color degree	NA	NA	2.9	1.0
Contest-S	35	381.5	C/F Grade	5552.7	19.5	369.9	11.6
Contest-S	85	363.8	C/F Grade	3267.0	15.7	369.9	-6.1
Contest-S	90	364.3	C/F Grade	881.5	8.1	369.9	-5.5
H2SD	45	13.7	Sticky point	48.3	50.8	28.4	-14.7
H2SD	50	21.7	Sticky point	22.7	22.0	28.4	-6.7
H2SD	105	49.8	Sticky point	179.4	26.9	28.4	21.4
HSI-NIR	110	18.2	Sticky point	7.8	15.3	18.2	0.0
KOTITI	5	8.0	KOTITI Grade	0.0	0.0	8.0	0.0
Minicard	95	2.6	ITMF Grade	0.1	14.8	2.6	0.0
Qualitativ	60	1.0	Grade	0.0	0.0	1.0	0.0
Quantitati	65	0.6	Percent	0.0	15.6	0.4	0.2
Quantitati	75	0.1	Percent	0.0	32.7	0.4	-0.2
SCT	15	69.0	Sticky point	12.8	5.2	38.4	30.6
SCT	25	36.3	Sticky point	7.1	7.3	38.4	-2.0
SCT	40	15.7	Sticky point	14.3	24.2	38.4	-22.7
SCT	55	45.5	Sticky point	156.3	27.5	38.4	7.1
SCT	70	37.2	Sticky point	16.2	10.8	38.4	-1.2
SCT	80	41.3	Sticky point	10.3	7.8	38.4	3.0
SCT	100	23.5	Sticky point	79.5	37.9	38.4	-14.9

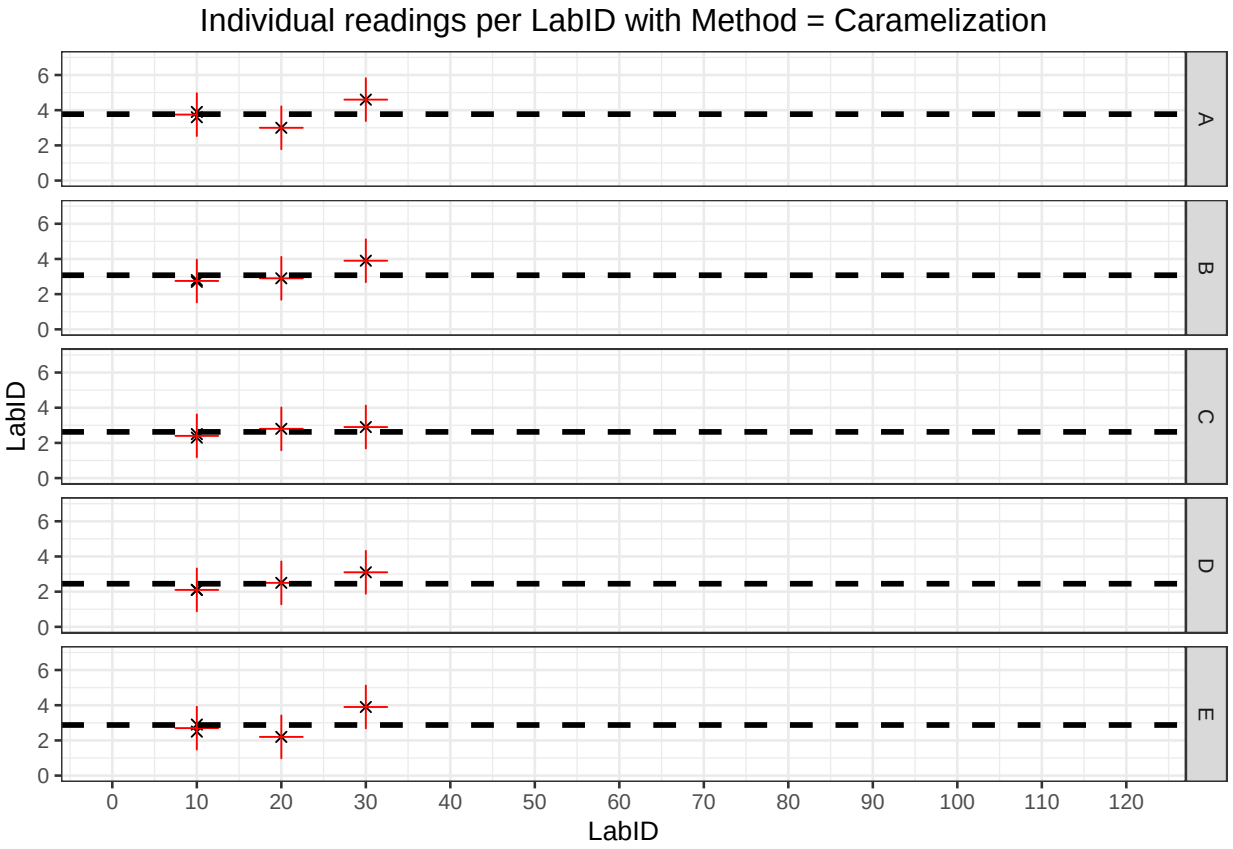
Data presented by boxplots per Method, LabID for each cotton [3]

This section was appearing for the last time in RT2019-1 as the same information is given in the next section in a much more concise way; therefore next section only will remain in future reports from RT2019-2 on.

[3]Footnote

* NA excluded.
* In each box, the bolded line represents the median of all individual results for the considered LabID.
* The square represents the upper 75% (Q75) and lower 25% (Q25) percentiles of the individual results.
* The whiskers represent the quantiles that included in +/- 1.5 * (Q75-Q25).
* Extreme points may additionally be displayed by a point further out from the whiskers.

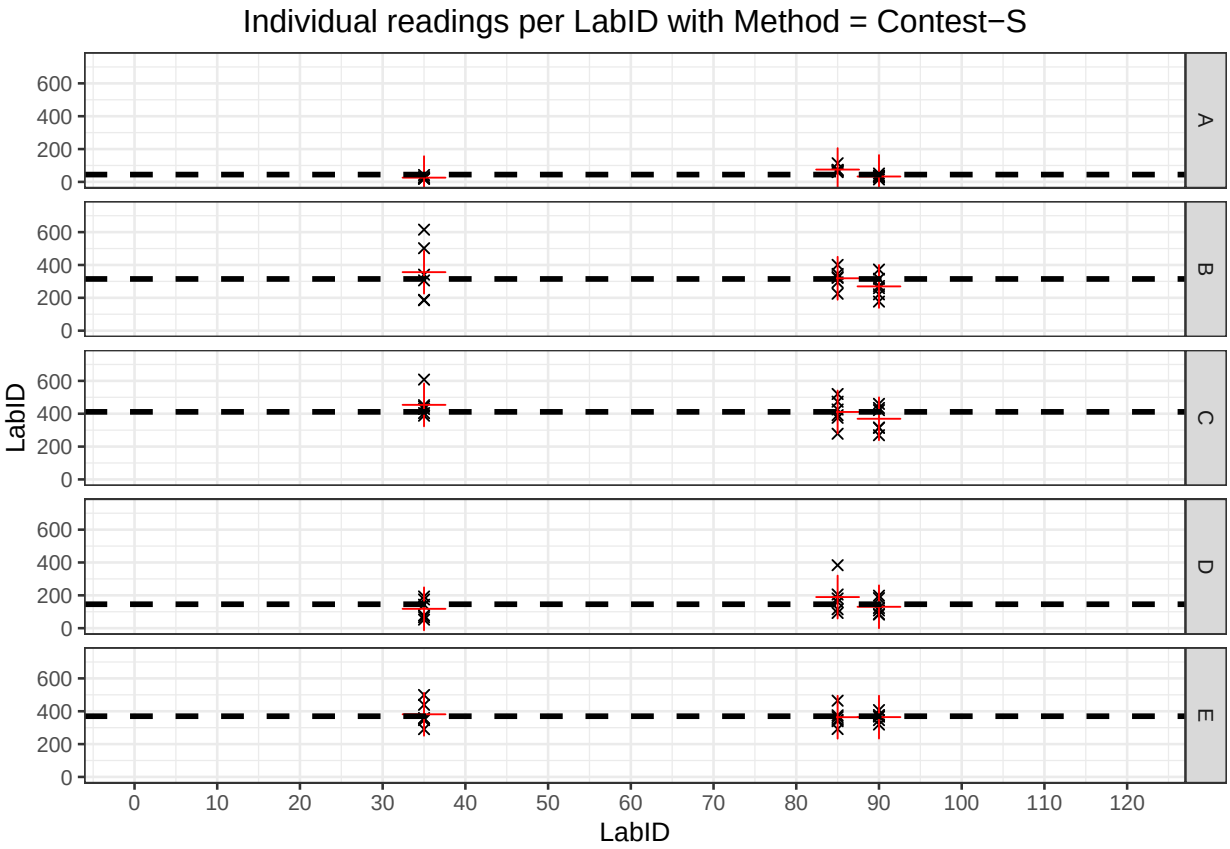
Charts of individual readings per Method and LabID for each cotton [4]

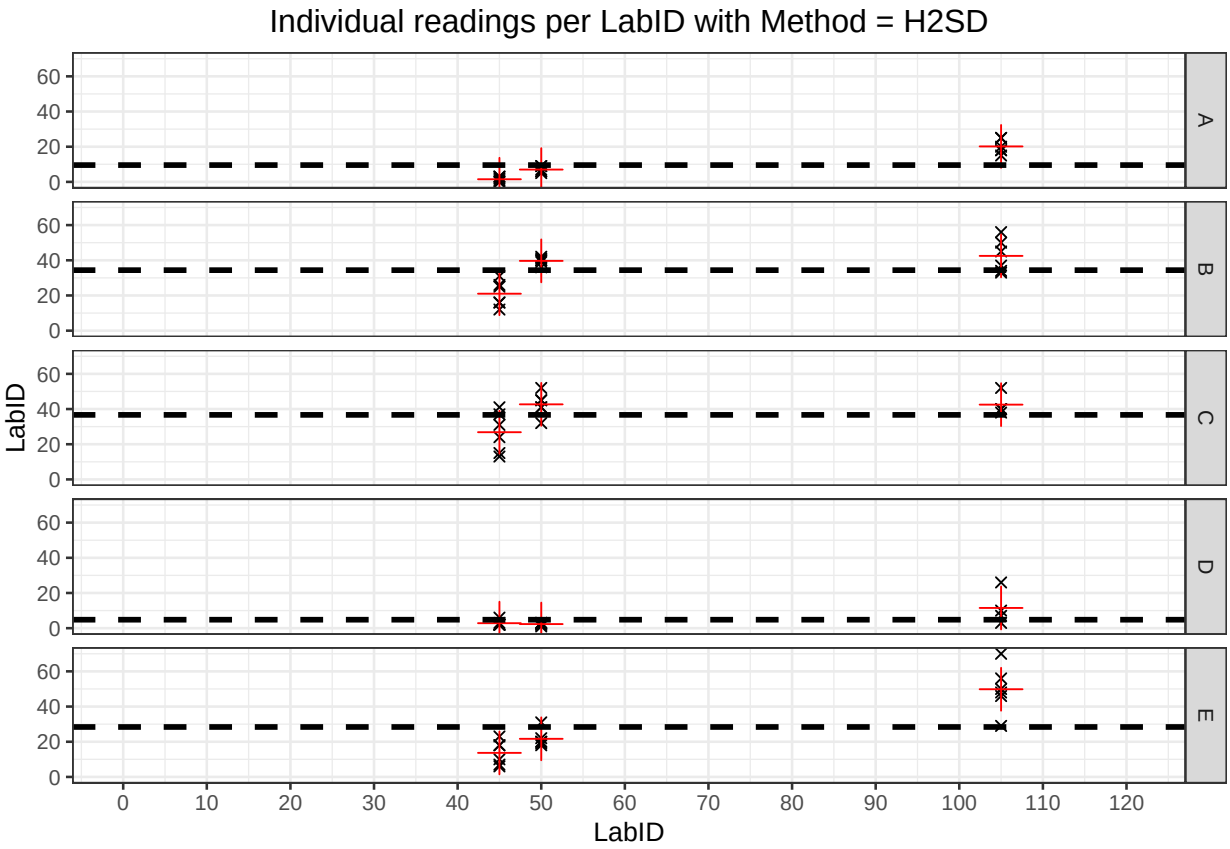


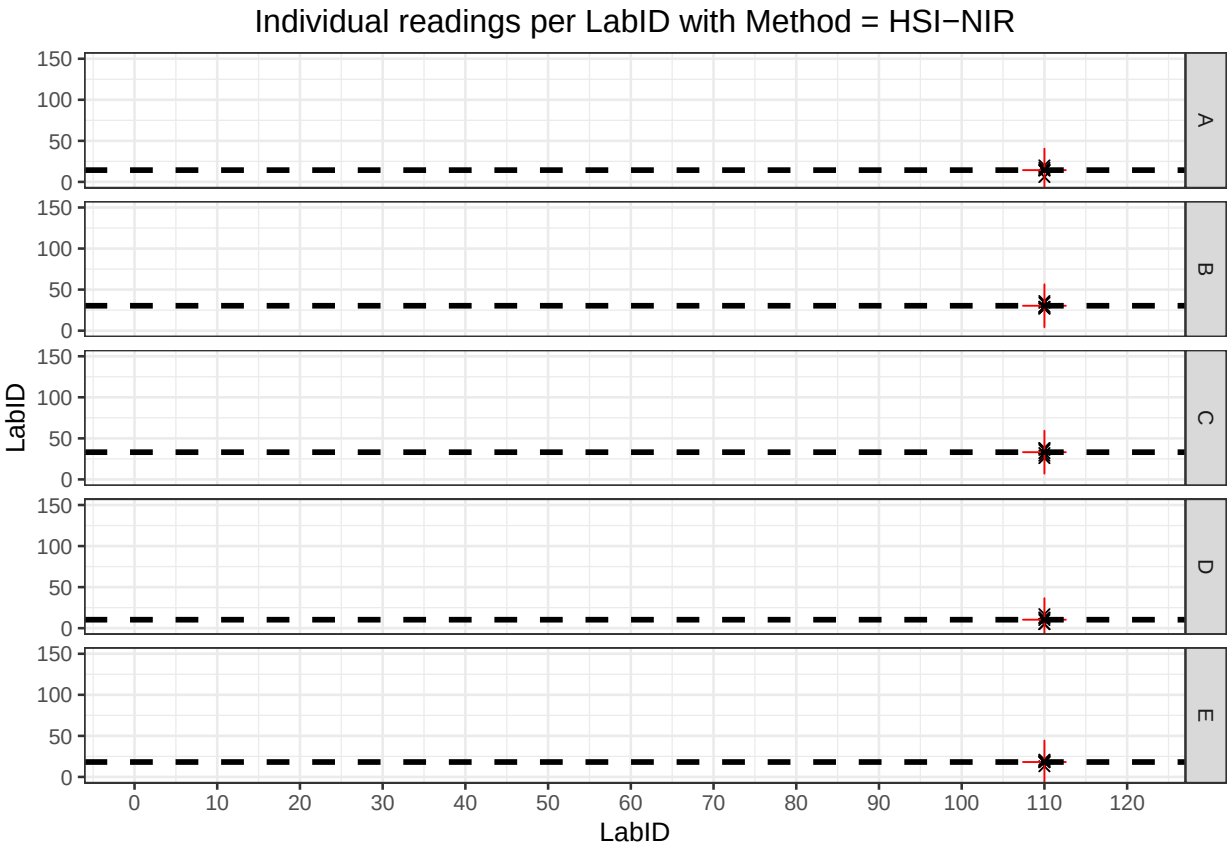
pdf 2

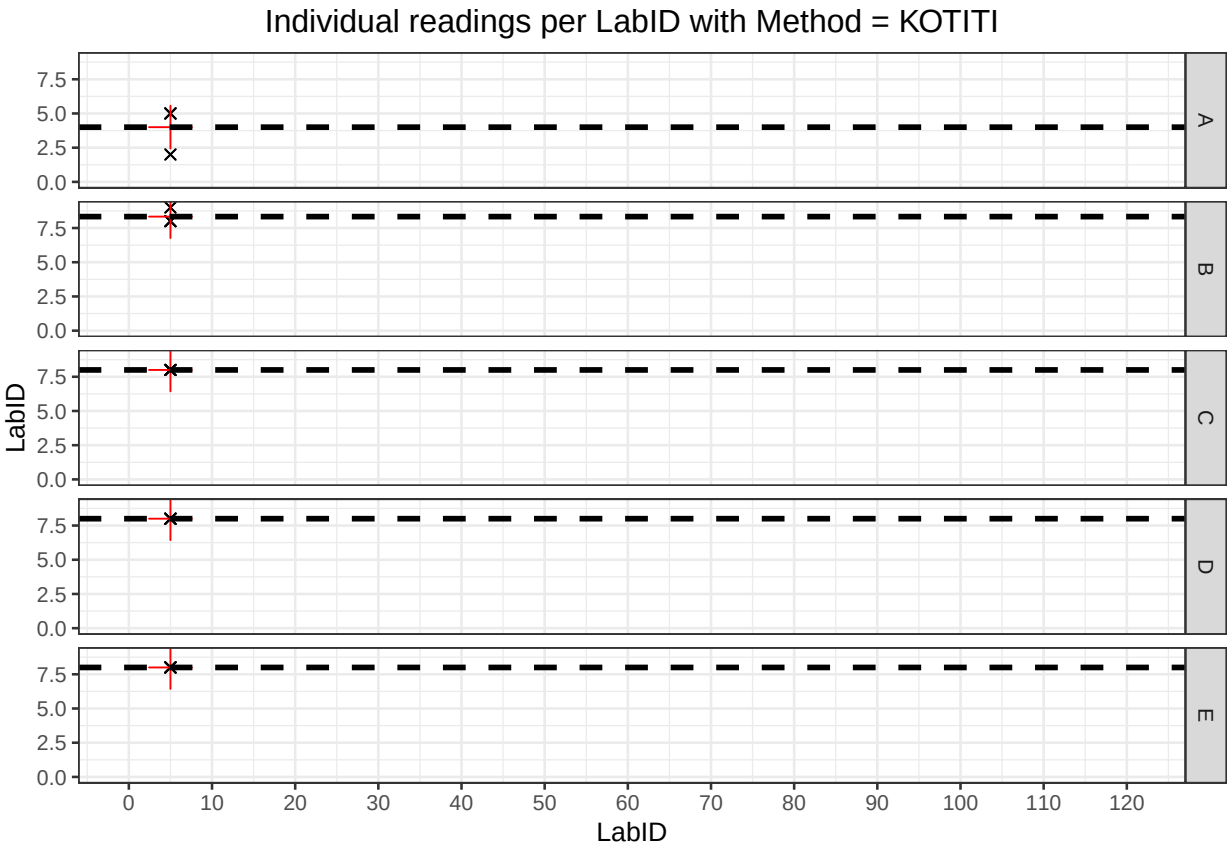
[4] Footnote

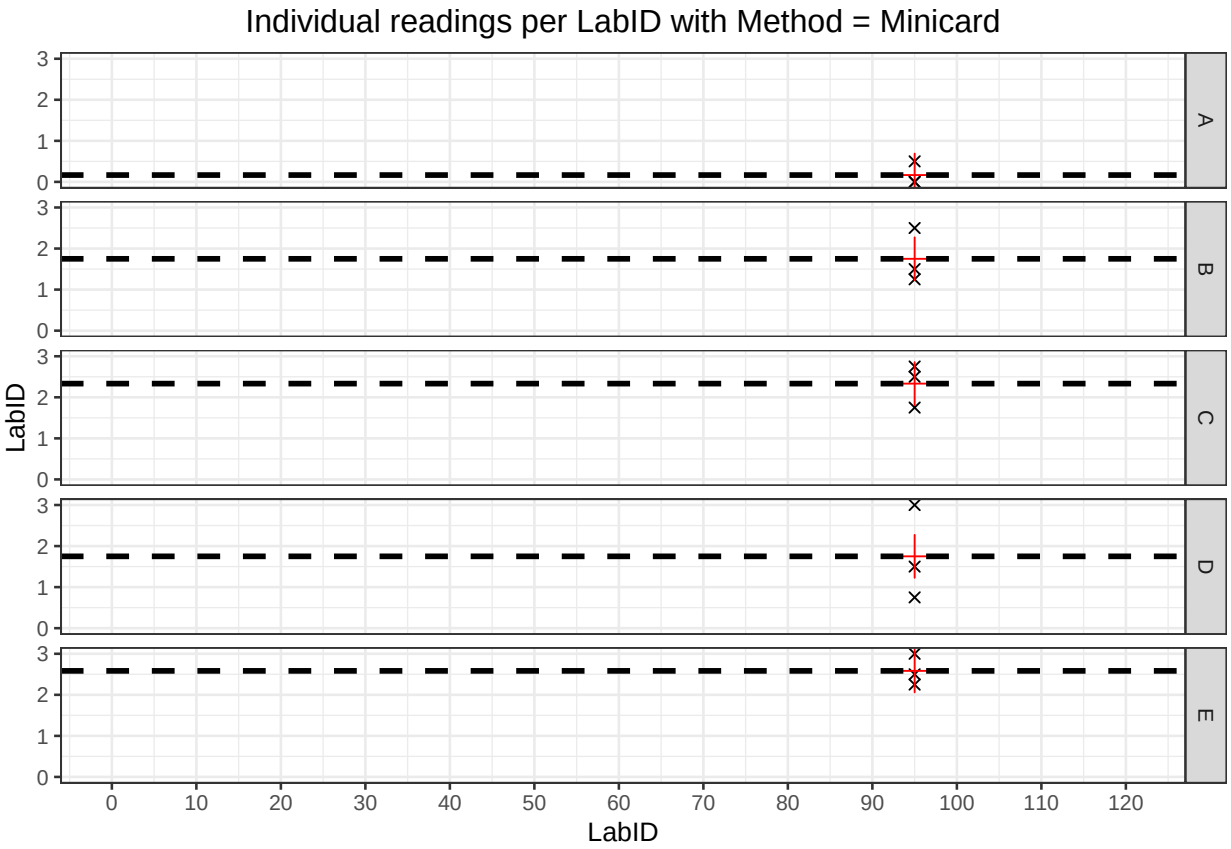
* NA excluded
* LabID are given in the abscissa axis at the bottom of the chart in the following charts.
* Black dashed line = Method GrandMean per cotton.
* Red + = Laboratory mean for the given method and for the given cotton.
* Black x = Laboratory individual reading for the given method and for the given cotton.

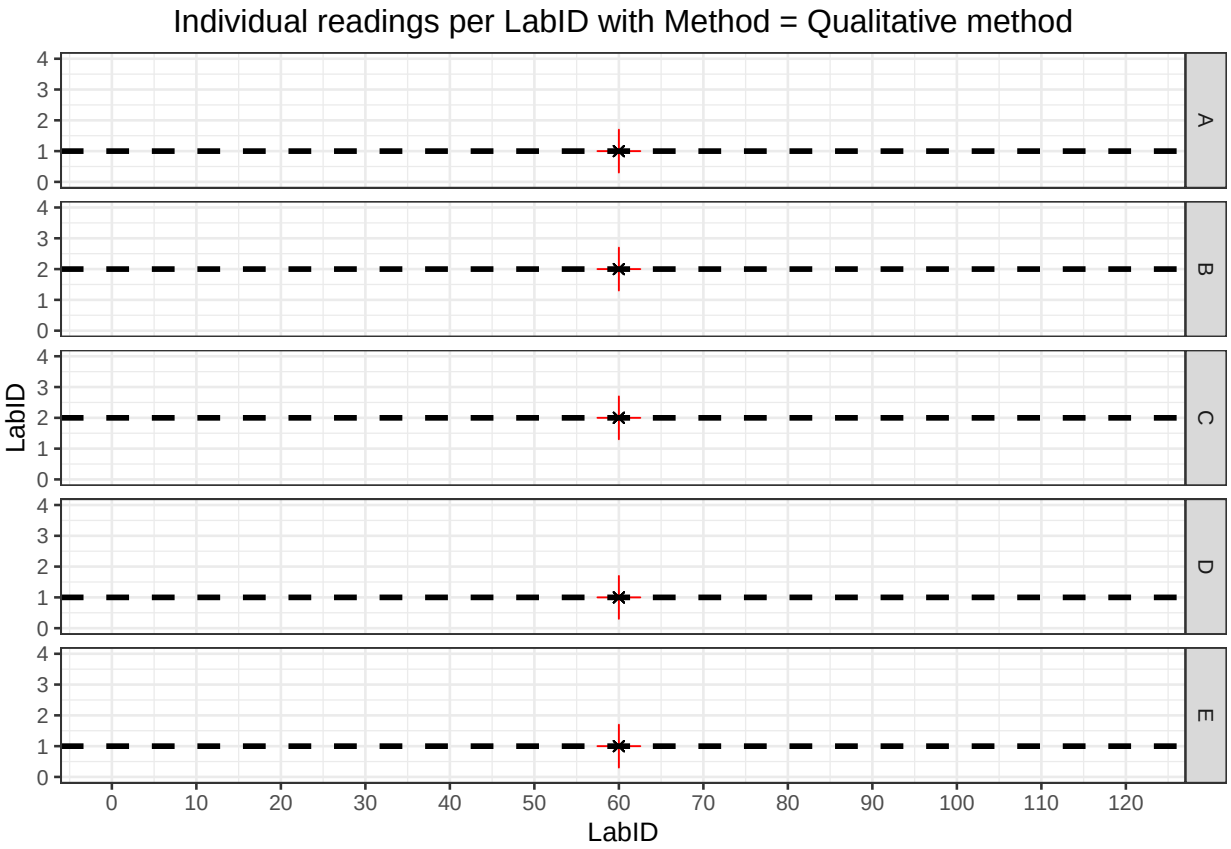

Individual readings per LabID with Method = Contest−S
LabID
LabID
A
B
C
D
E
0
200
400
600
0
10
20
30
40
50
60
70
80
90
100
110
120

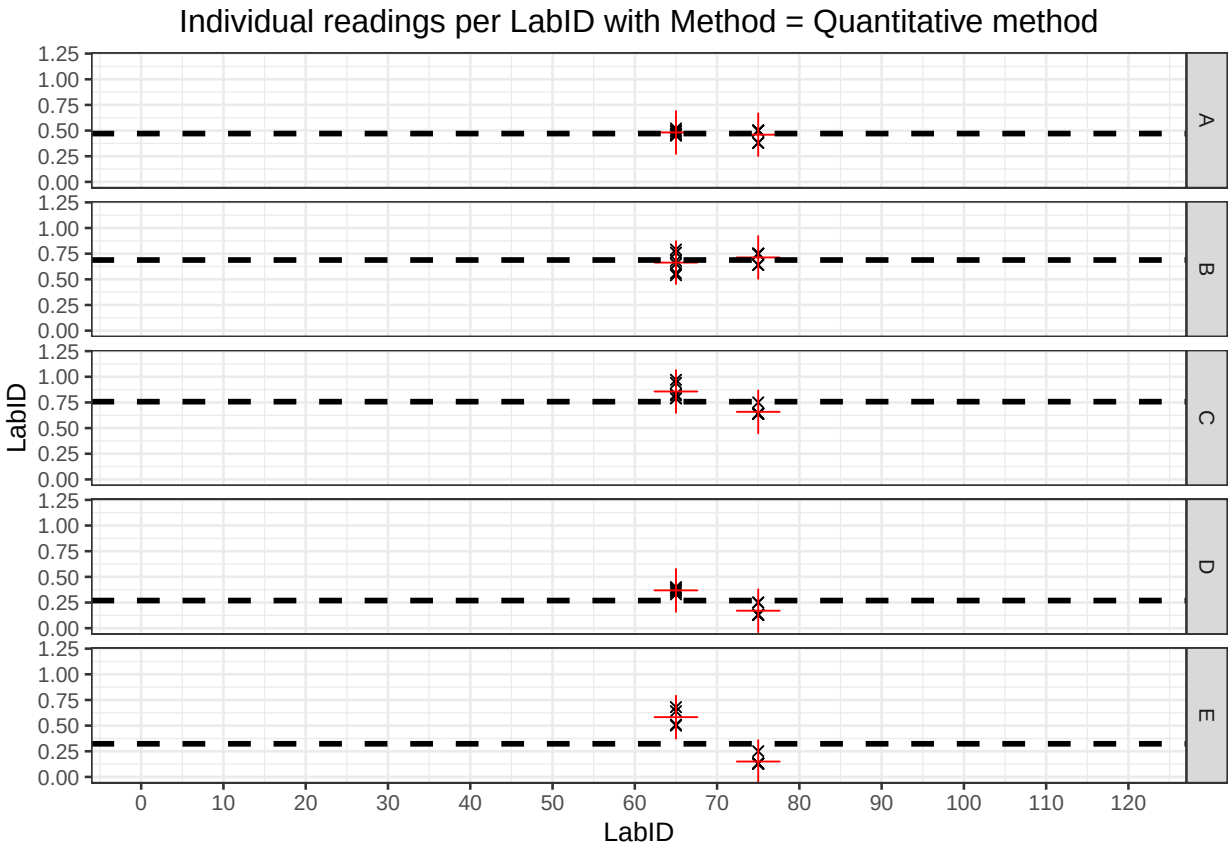

Individual readings per LabID with Method = H2SD
LabID
LabID
A
B
C
D
E
0
20
40
60
0
10
20
30
40
50
60
70
80
90
100
110
120

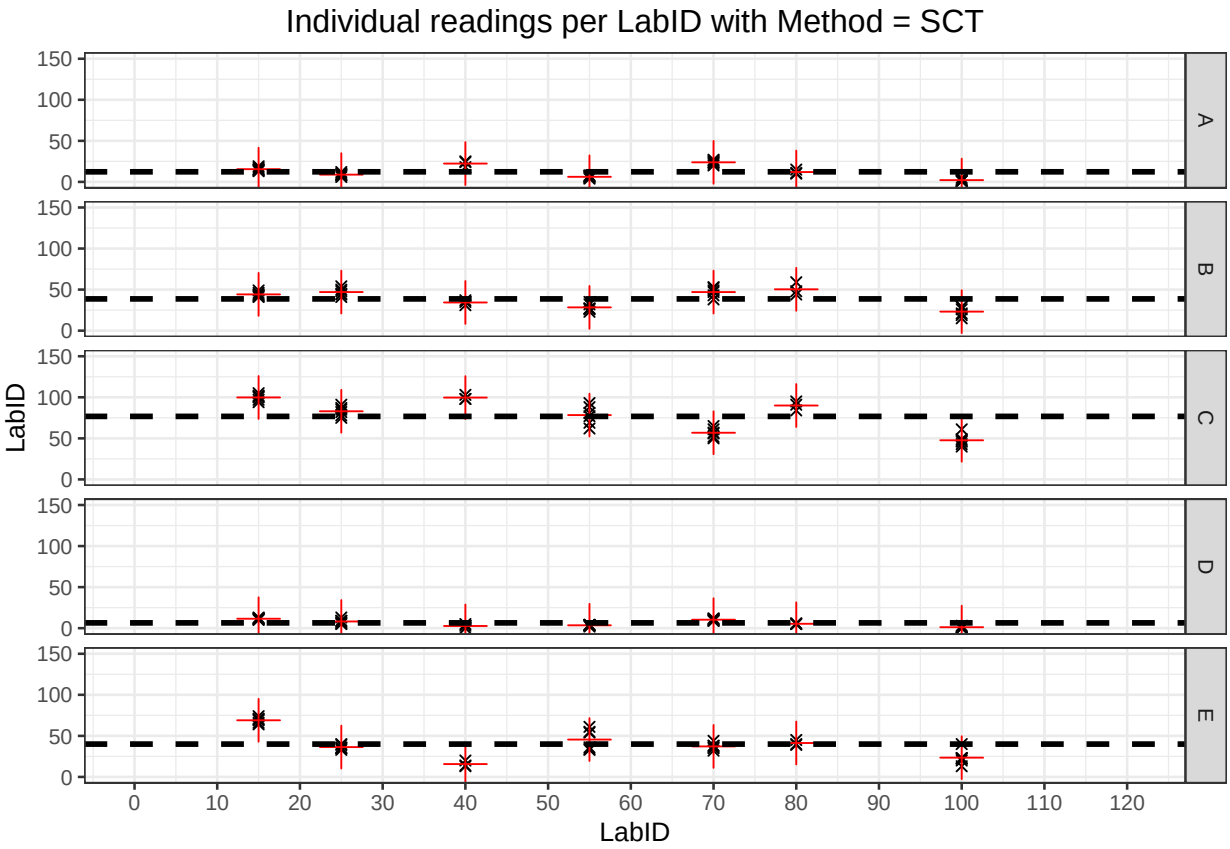

Individual readings per LabID with Method = HSI−NIR
LabID
LabID
A
B
C
D
E
150
100
50
0
0
10
20
30
40
50
60
70
80
90
100
110
120


Individual readings per LabID with Method = KOTITI
LabID
7.5
5.0
2.5
0.0
A
B
C
D
E
0
10
20
30
40
50
60
70
80
90
100
110
120
LabID


Individual readings per LabID with Method = Minicard
LabID
LabID
A
B
C
D
E
0
1
2
3
0
10
20
30
40
50
60
70
80
90
100
110
120

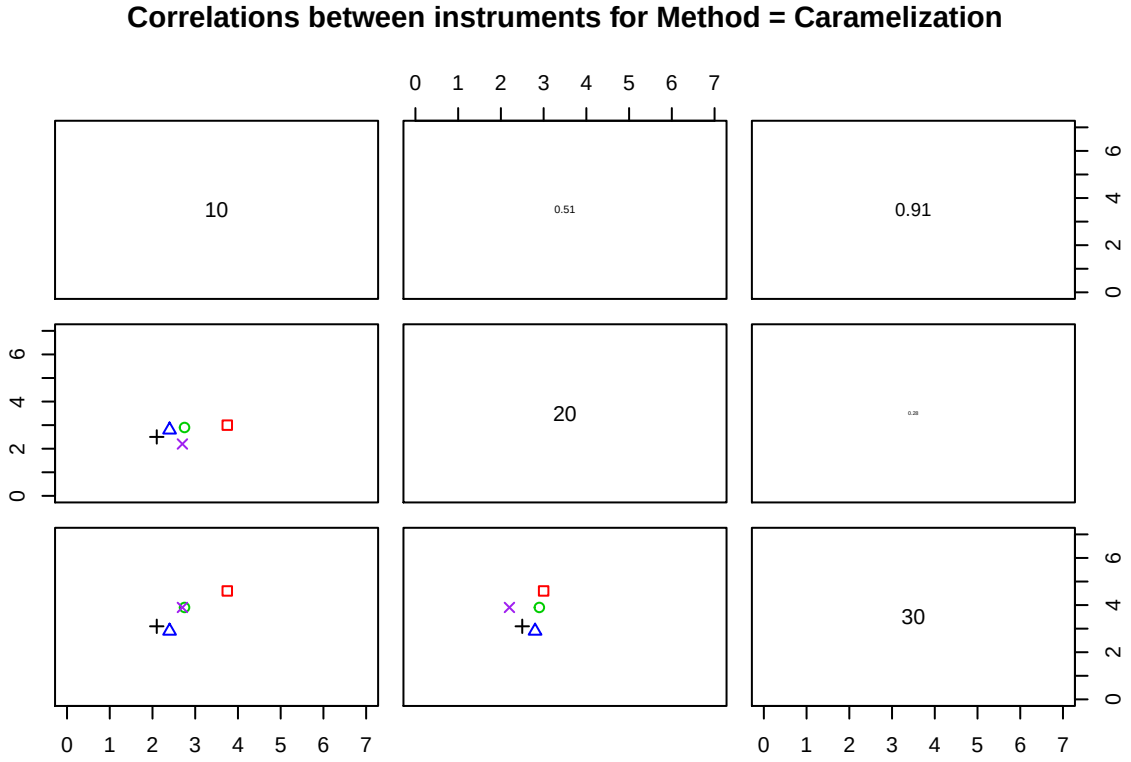

Individual readings per LabID with Method = Qualitative method
LabID
LabID
A
B
C
D
E
0
1
2
3
4
0
10
20
30
40
50
60
70
80
90
100
110
120


Individual readings per LabID with Method = Quantitative method
LabID
1.25
1.00
0.75
0.50
0.25
0.00
A
B
C
D
E
0
10
20
30
40
50
60
70
80
90
100
110
120
LabID


Individual readings per LabID with Method = SCT
LabID
LabID
A
B
C
D
E
150
100
50
0
0
10
20
30
40
50
60
70
80
90
100
110
120

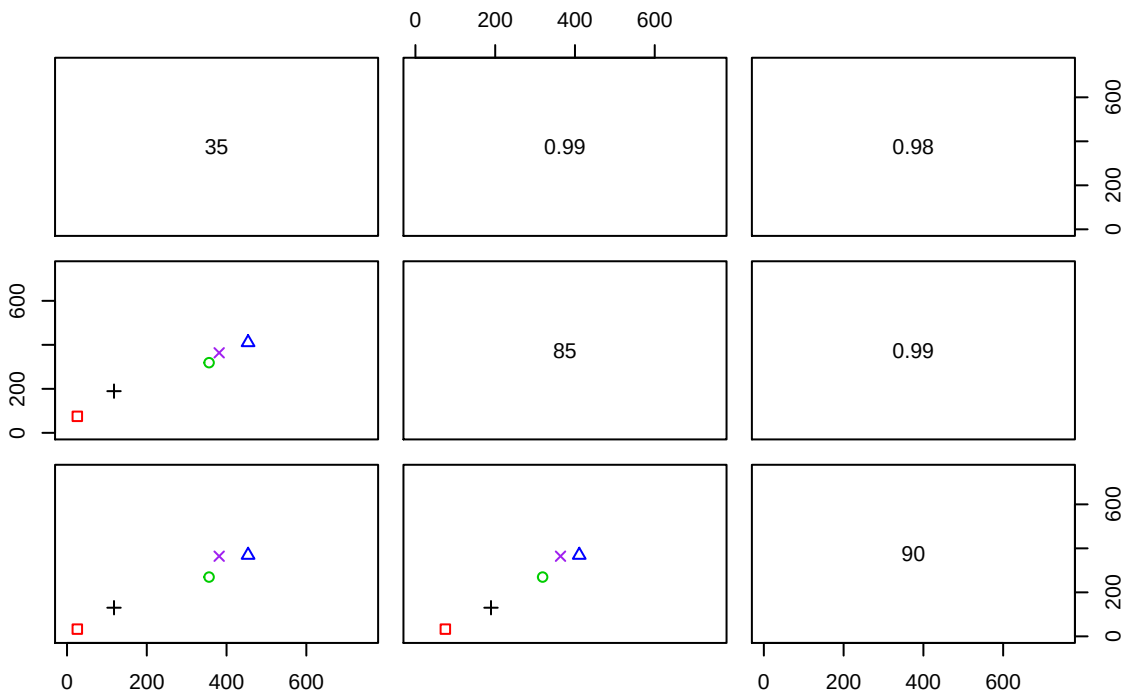
Correlation charts and correlation values between LabID using a same Method for all cottons [5]

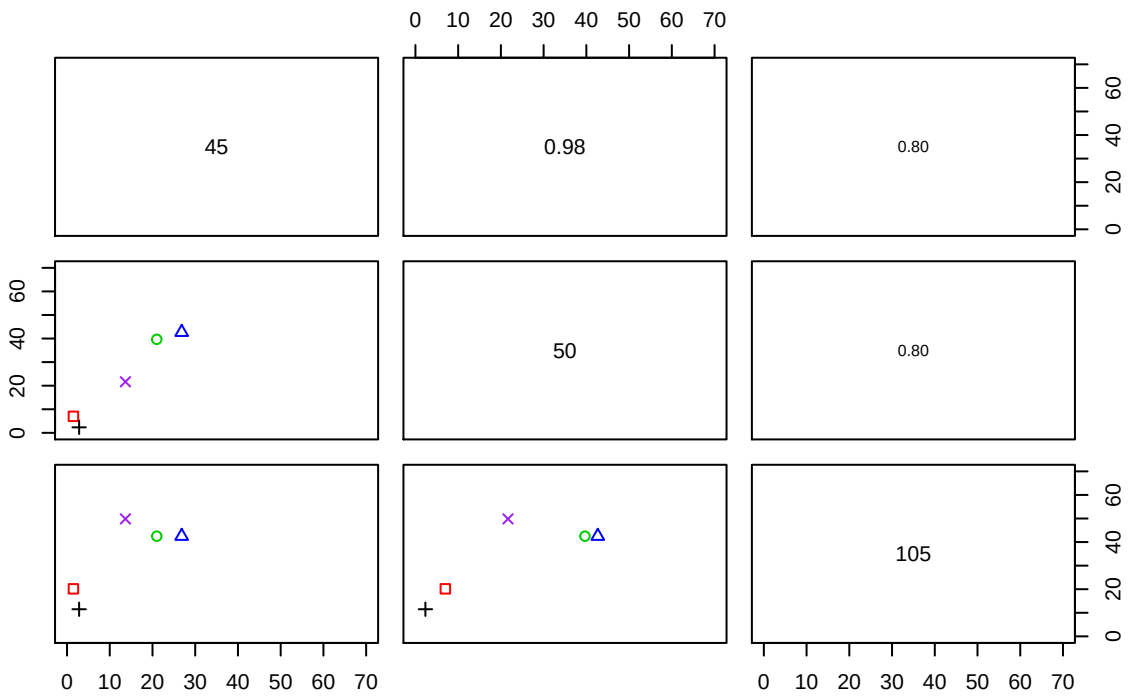
A correlation matrix of charts is provided only when two or more instruments were used for a given method.

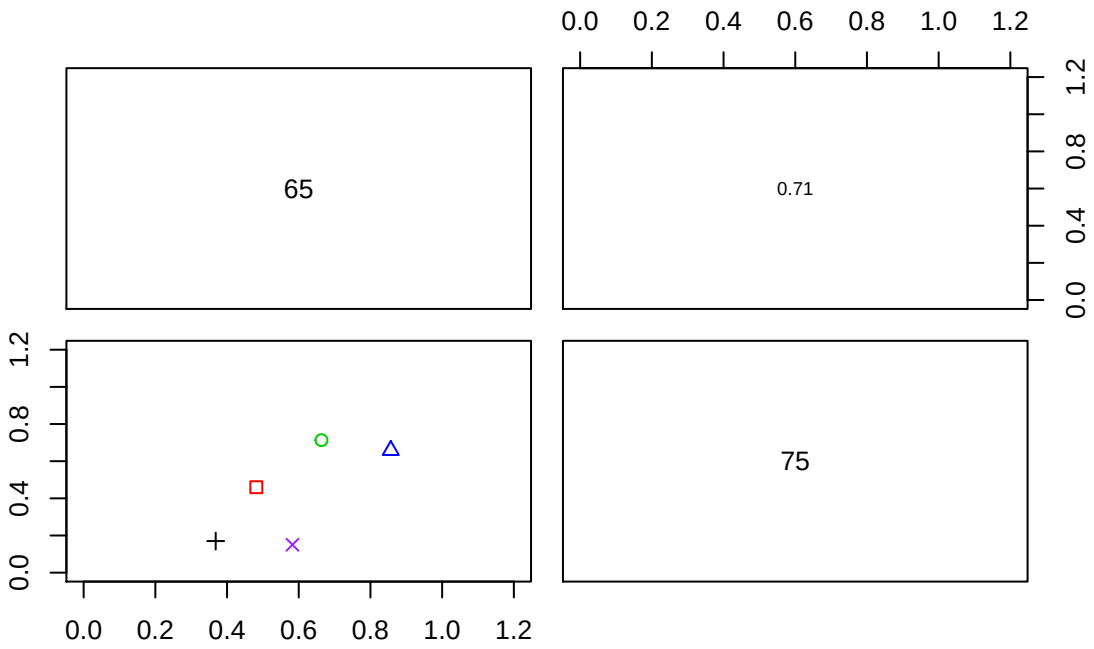


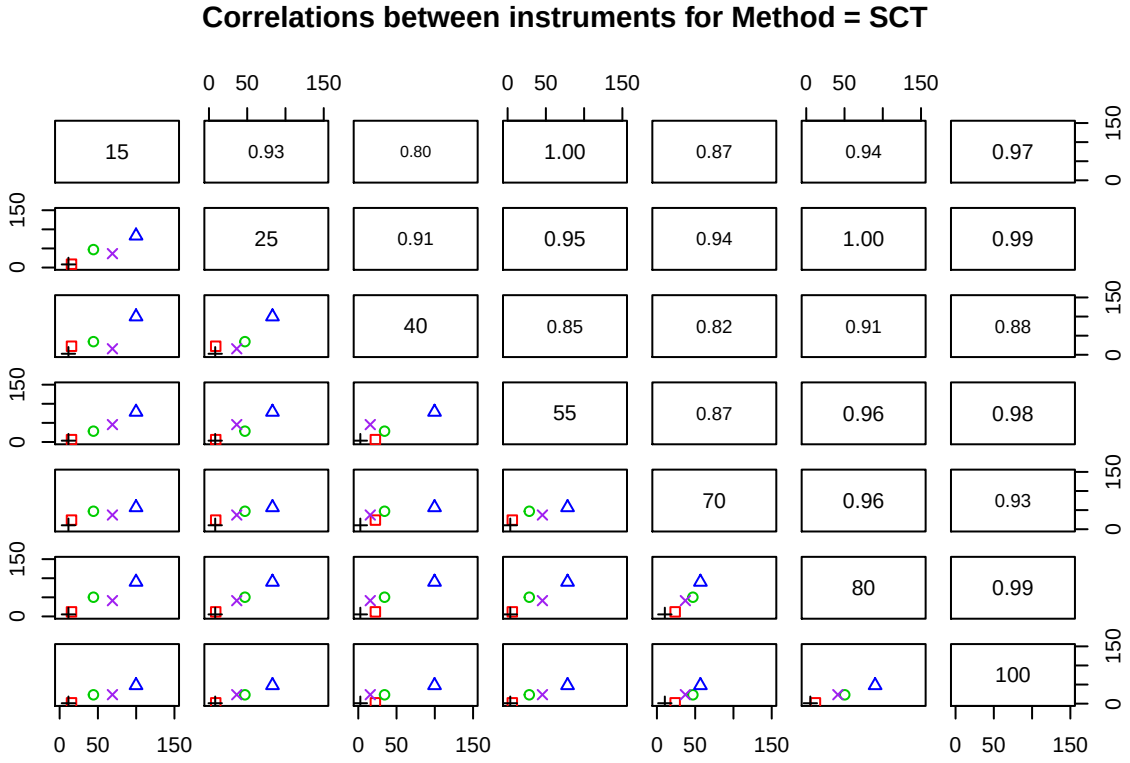
[5]Footnote

* Based on Means of available results (NA excluded)
* LabIds are given in the diagonal of the matrix.
* Squares in red for Cotton A, rounds in green for Cotton B, triangles in blue for Cotton C, + in black for cotton D, and x in purple for cotton E.
* The lower left corner of the matrix provides the correlation charts, while the upper right corner of the matrix provides the corresponding raw correlation coefficients. Higher the correlation coefficient, larger the font size of the corresponding text.


Correlations between instruments for Method = Contest−S
0
200
400
600
35
0.99
0.98
85
0.99
90


Correlations between instruments for Method = H2SD
45
0.98
0.80
50
0.80
105
0 10 20 30 40 50 60 70
0 20 40 60

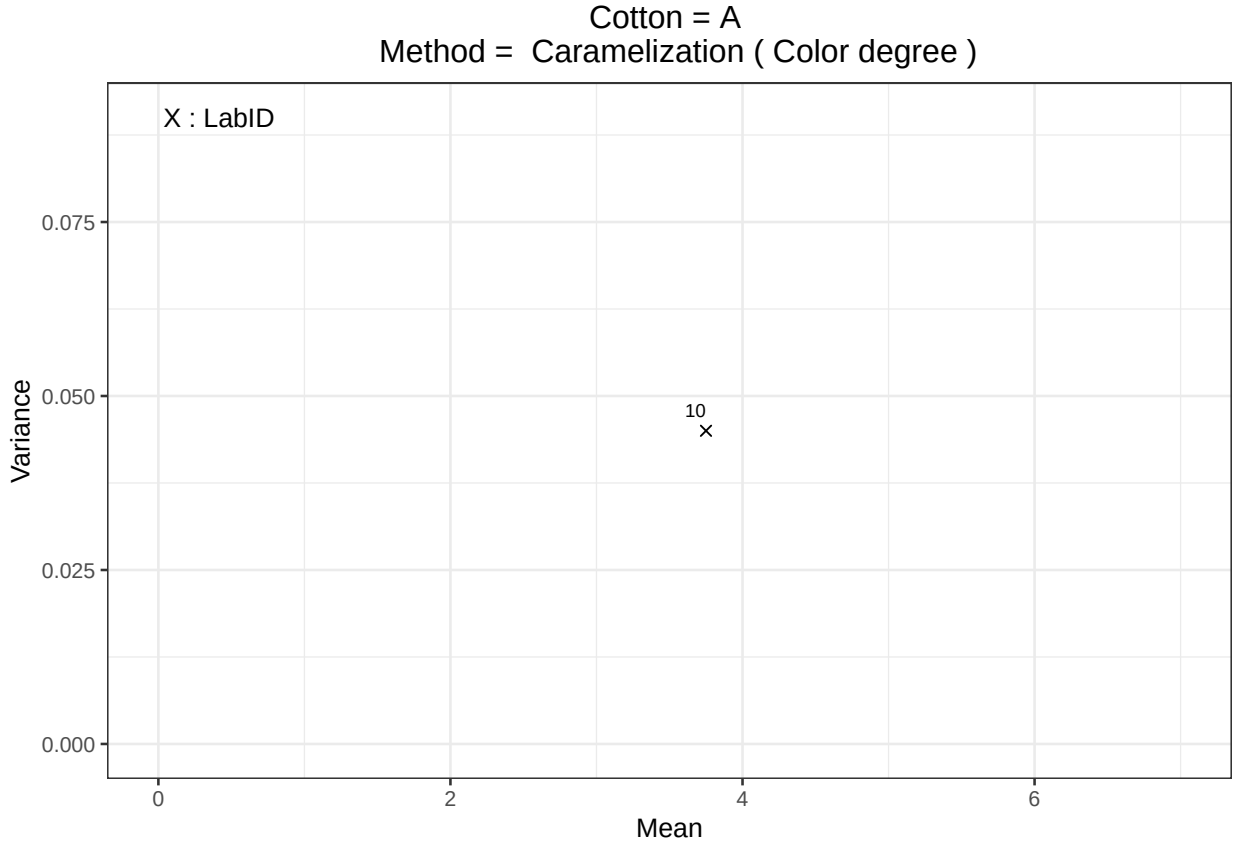

Correlations between instruments for Method = Quantitative method
65
0.71
75
0.0
0.2
0.4
0.6
0.8
1.0
1.2


Correlations between instruments for Method = SCT
0 50 150
15
0.93
0.80
1.00
0.87
0.94
0.97
25
0.91
0.95
0.94
1.00
0.99
40
0.85
0.82
0.91
0.88
55
0.87
0.96
0.98
70
0.96
0.93
80
0.99
100

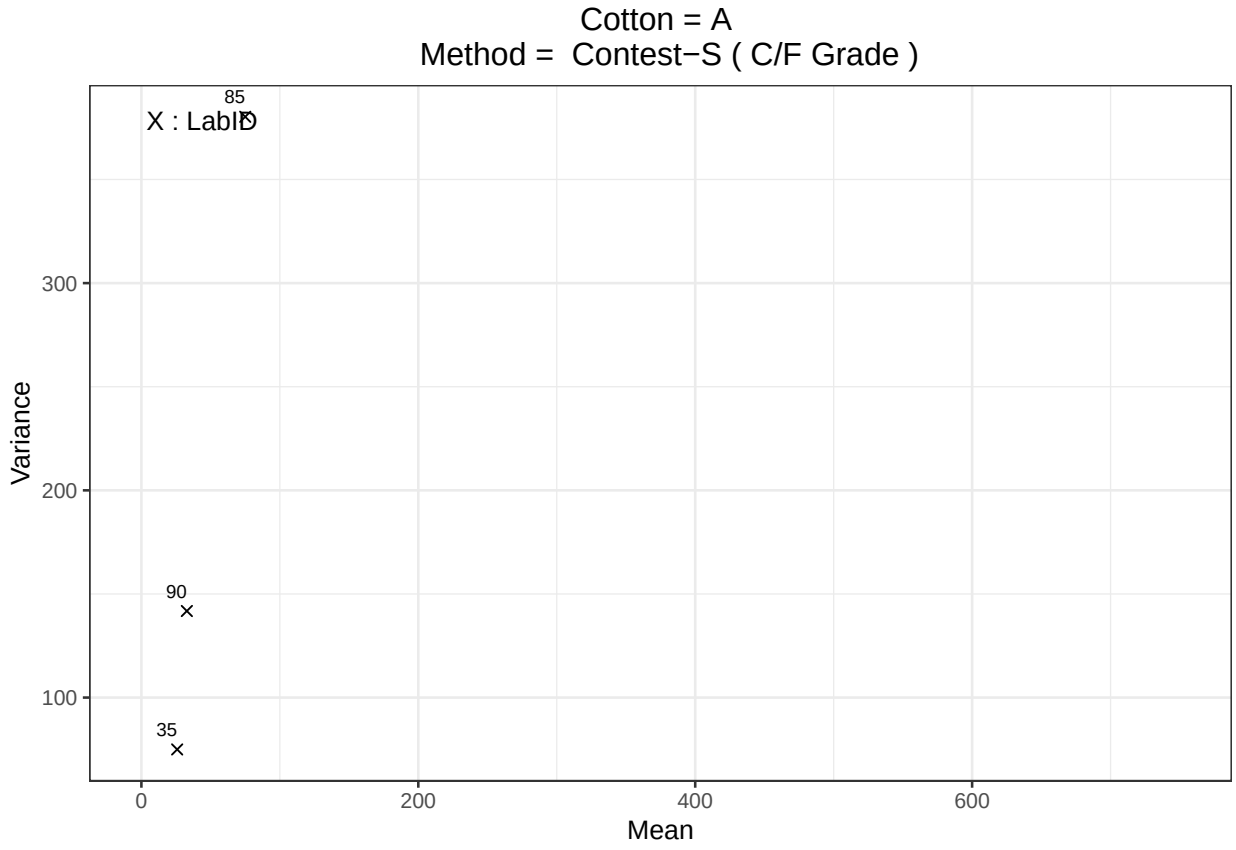
Charts Variance = f(Mean) for each Cotton and Method, taking care of LabIDs

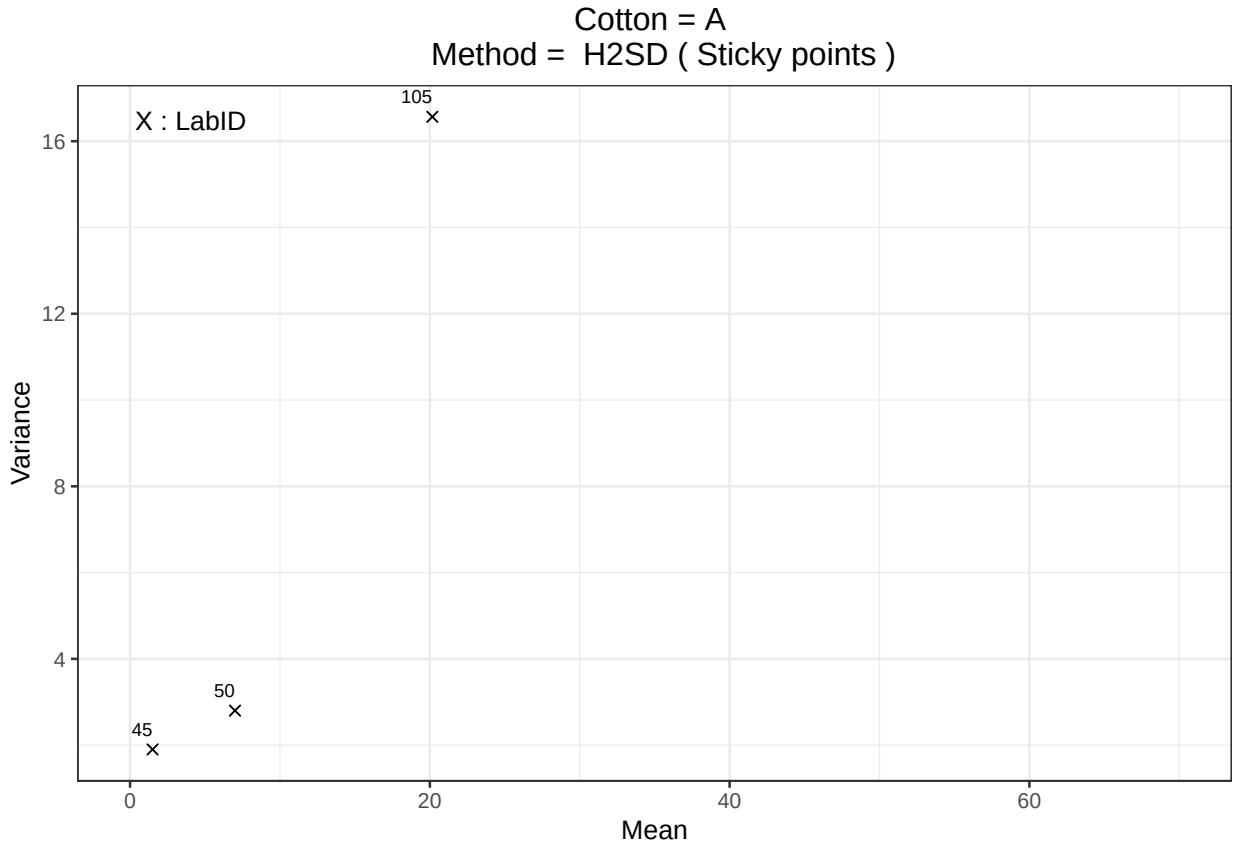
This type of chart is devoted to displaying the ability of laboratories to reproduce themselves for each cotton, based on the n readings (up to six) they provided for each cotton sample. Stickiness has the reputation to be heterogeneously distributed within samples (whatever the efforts we made for homogenizing cotton masses before dispatching representative samples); therefore, if methods are sensitive enough, then a certain level of variance (displayed on the vertical axis in the following charts) is to be seen when the number of measurements exceeds 1 in this test.

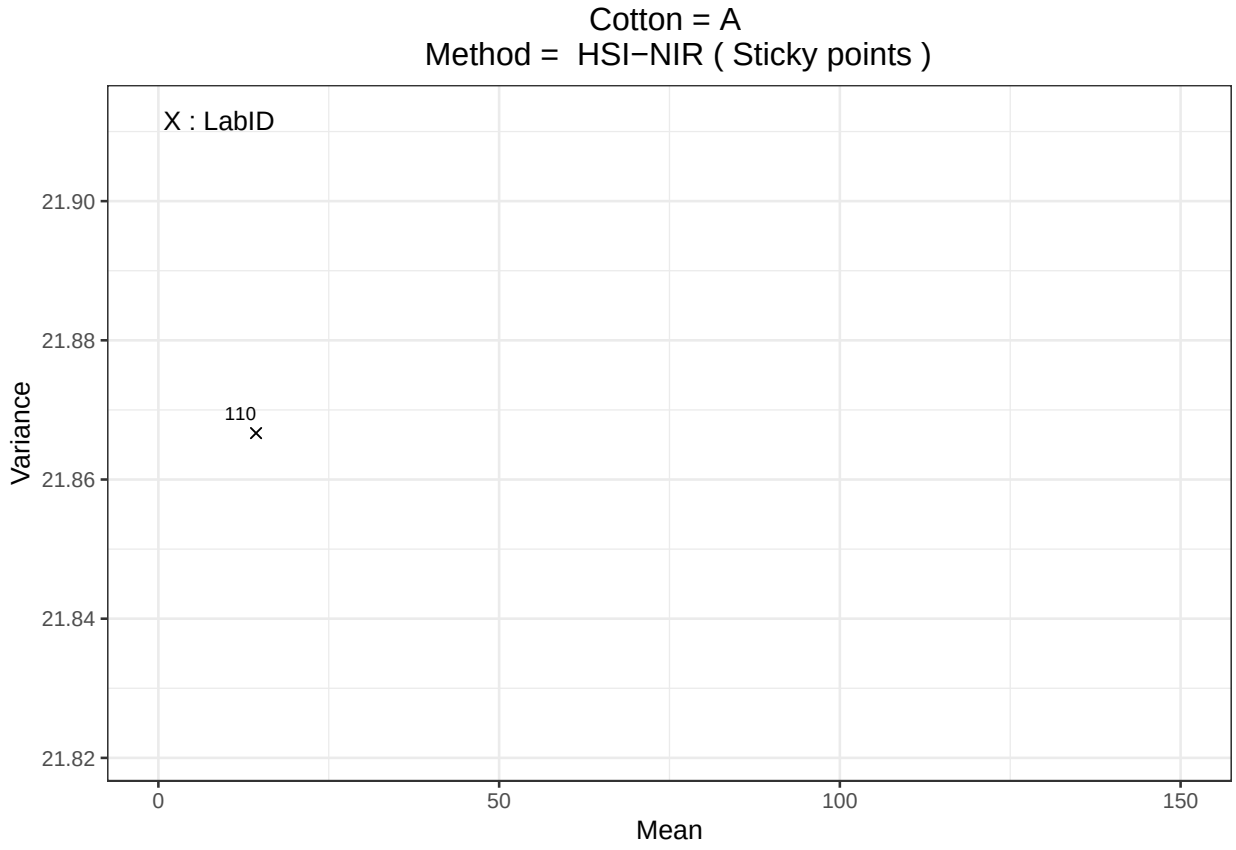
Cotton A : Variance between individual measurements = f(Mean) for all concerned labs

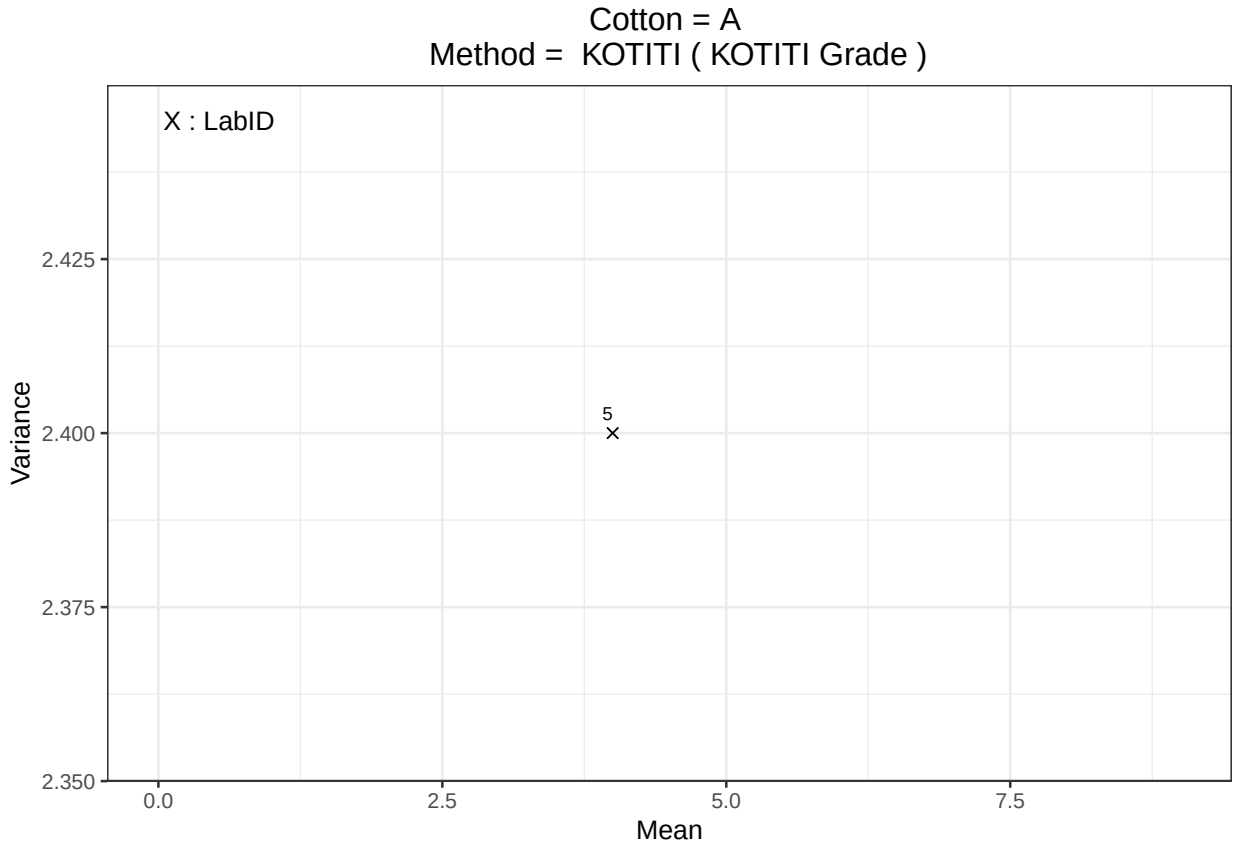


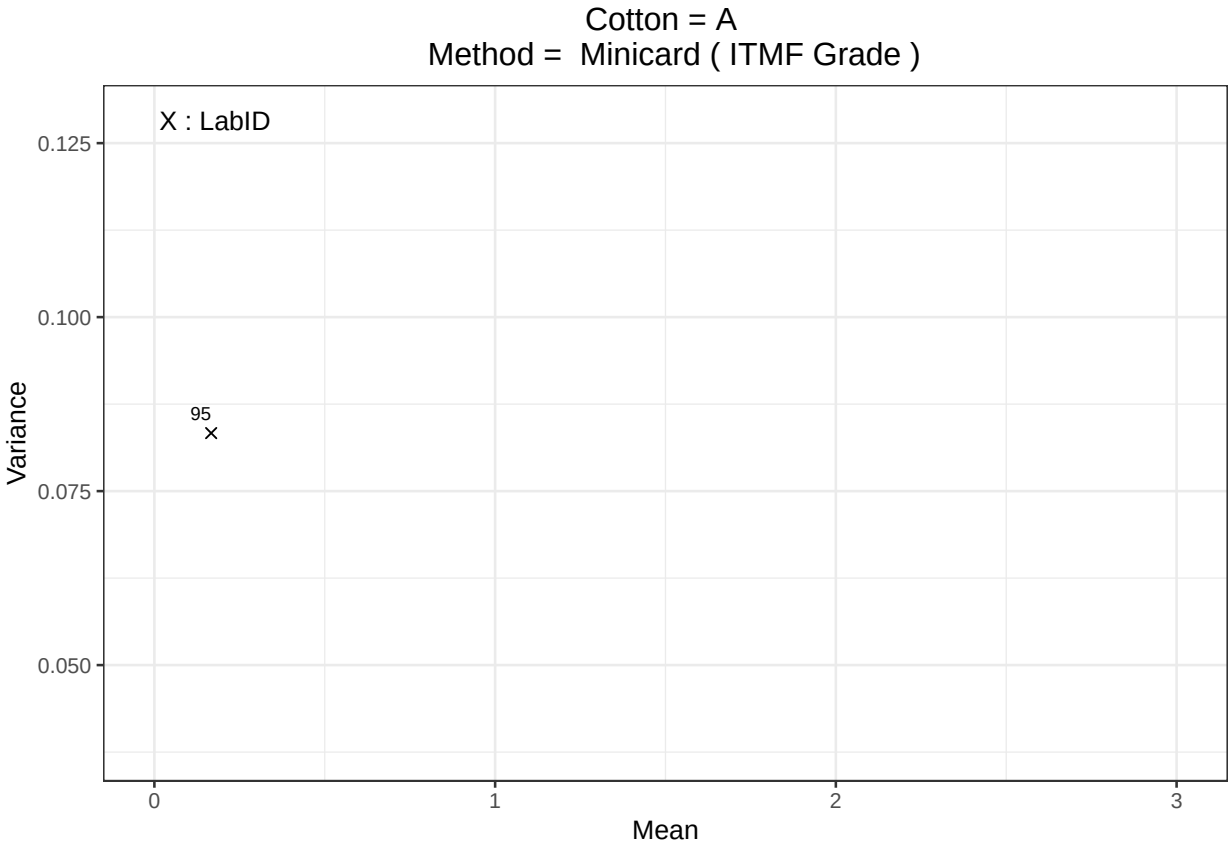
[1] "For Cotton = A and for method = Caramelization , 2 LabID (LabID being , 20, 30) cannot be shown on this chart as only one measurement was performed and, therefore, a variance cannot be calculated in this case."

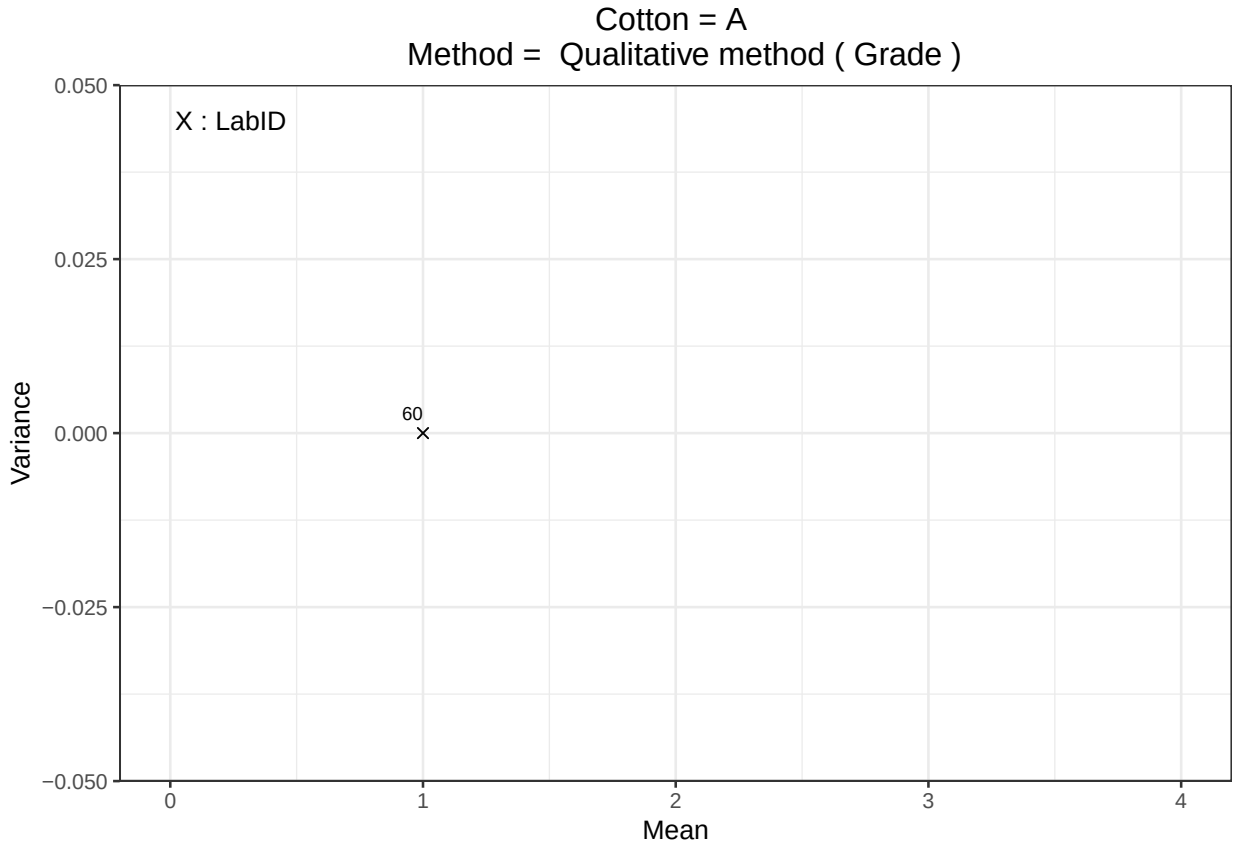

Cotton = A
Method = Contest−S (C/F Grade)
X : LabID
85
90
35
300
200
100
Variance
0
200
400
600
Mean

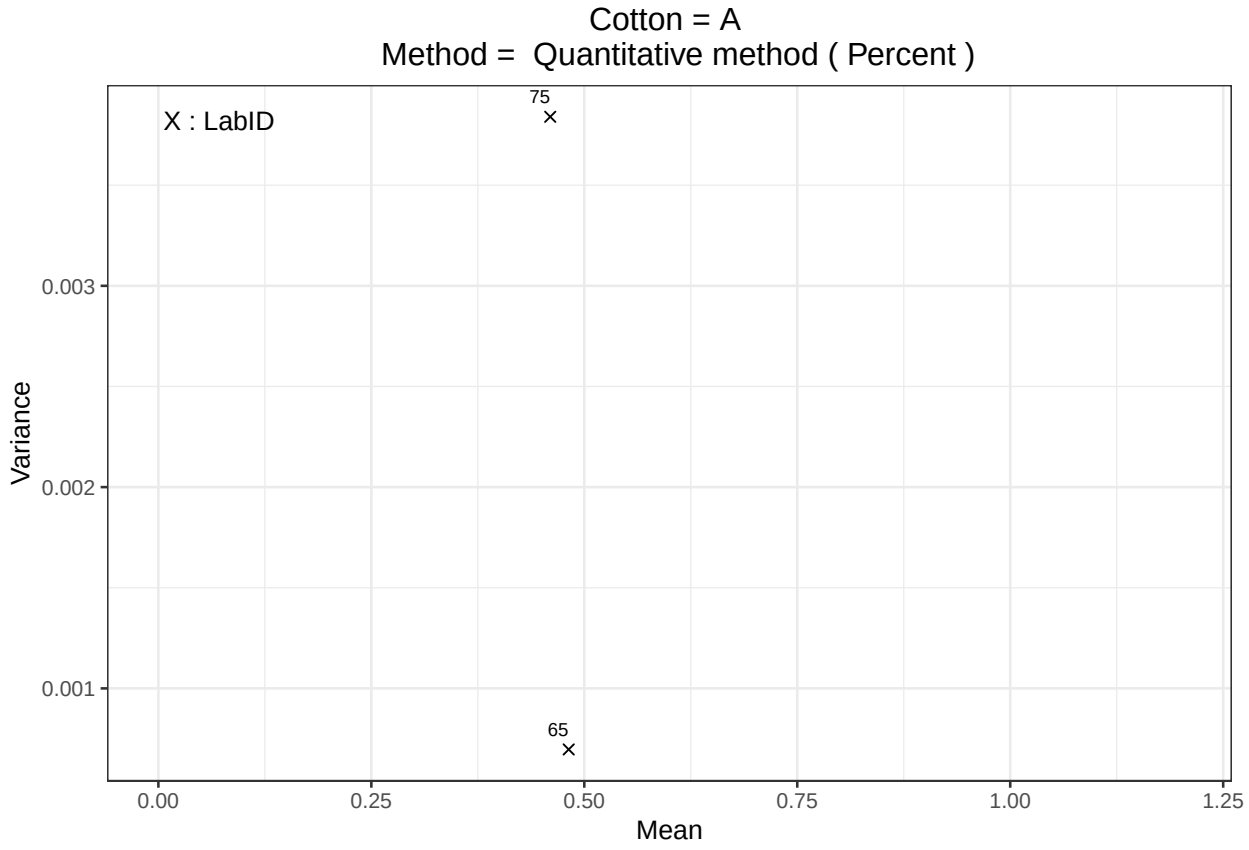

Cotton = A
Method = H2SD (Sticky points)
X : LabID
105
50
45
Variance
16
12
8
4
0
20
40
60
Mean

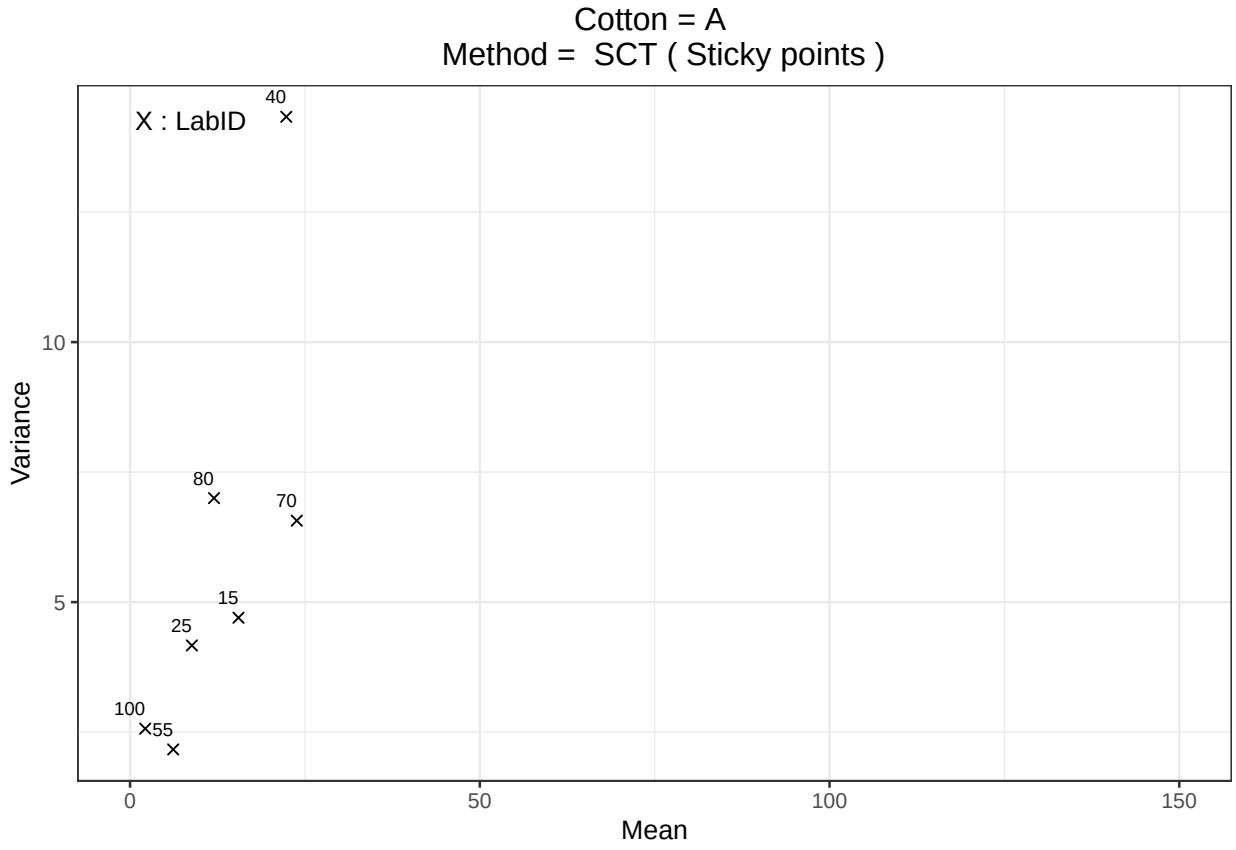

Cotton = A
Method = HSI−NIR (Sticky points)
X : LabID
21.90
21.88
21.86
21.84
21.82
Variance
110
0
50
100
150
Mean


Cotton = A
Method = KOTITI (KOTITI Grade)
X : LabID
2.425
2.400
2.375
2.350
Variance
5
0.0
2.5
5.0
7.5
Mean

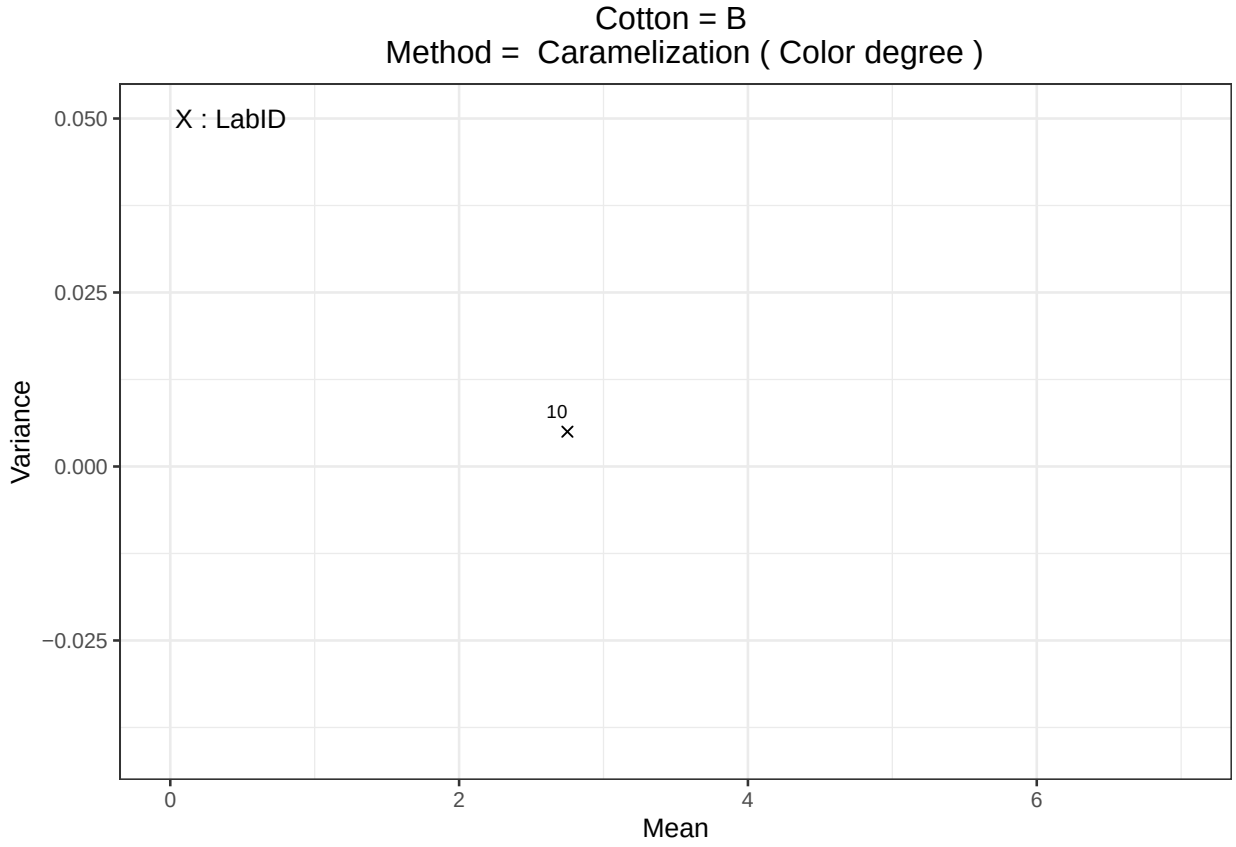

Cotton = A
Method = Minicard (ITMF Grade)
X : LabID
0.125
0.100
0.075
0.050
Variance
95
0
1
2
3
Mean


Cotton = A
Method = Qualitative method (Grade)
X : LabID
60
Variance
Mean
0.050
0.025
0.000
−0.025
−0.050
0
1
2
3
4

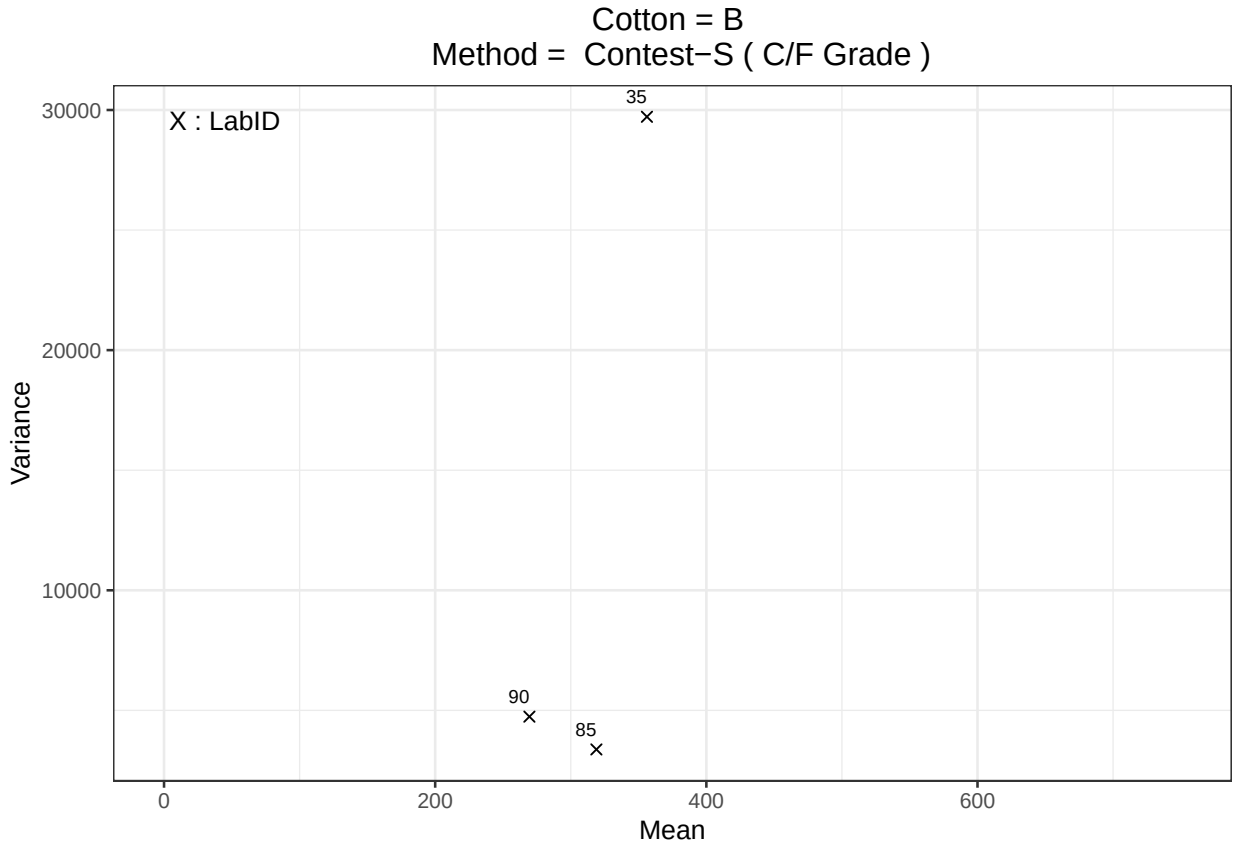

Cotton = A
Method = Quantitative method (Percent)
X : LabID
75
65
Variance
0.003
0.002
0.001
0.00
0.25
0.50
0.75
1.00
1.25
Mean

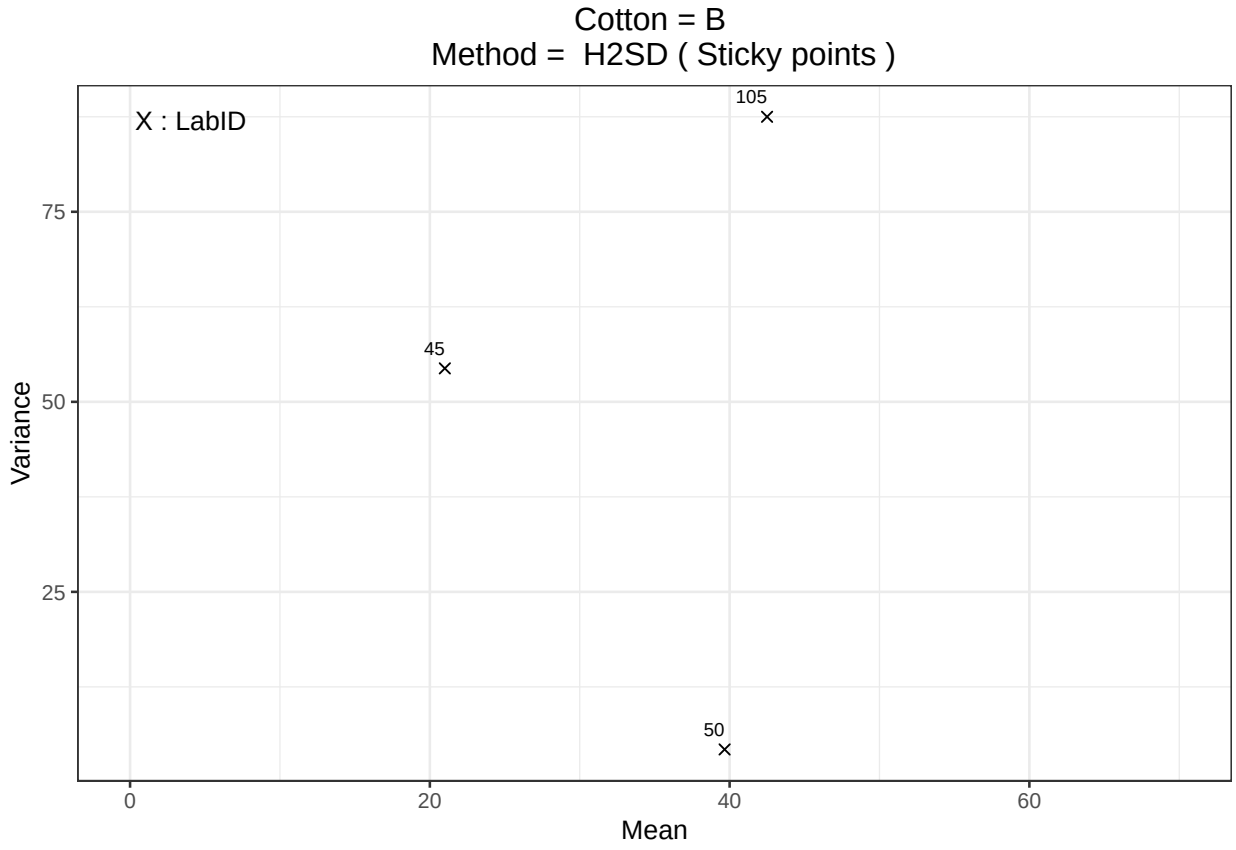

Cotton = A
Method = SCT (Sticky points)
X : LabID
40
80
70
15
25
100
55
Variance
10
5
0
50
100
150
Mean

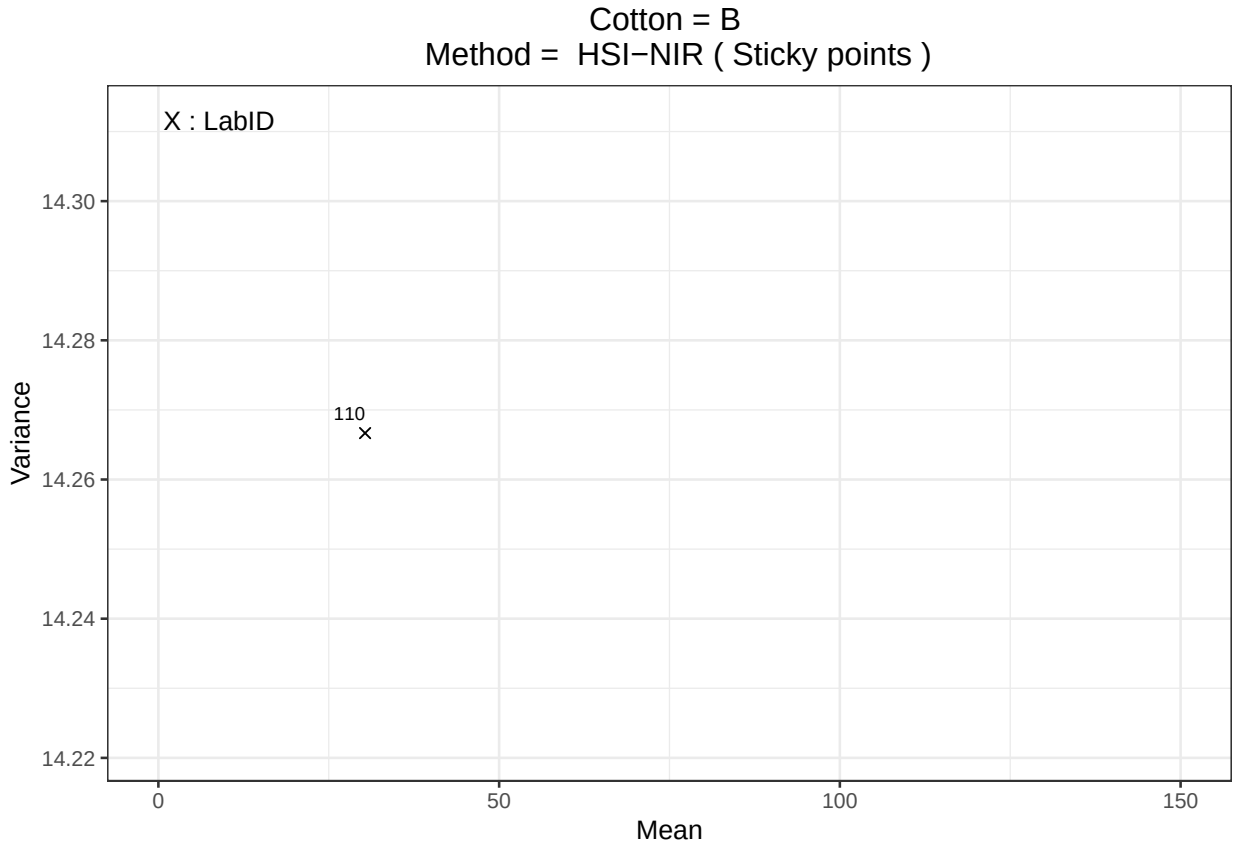
Cotton B : Variance between individual measurements = f(Mean) for all concerned labs

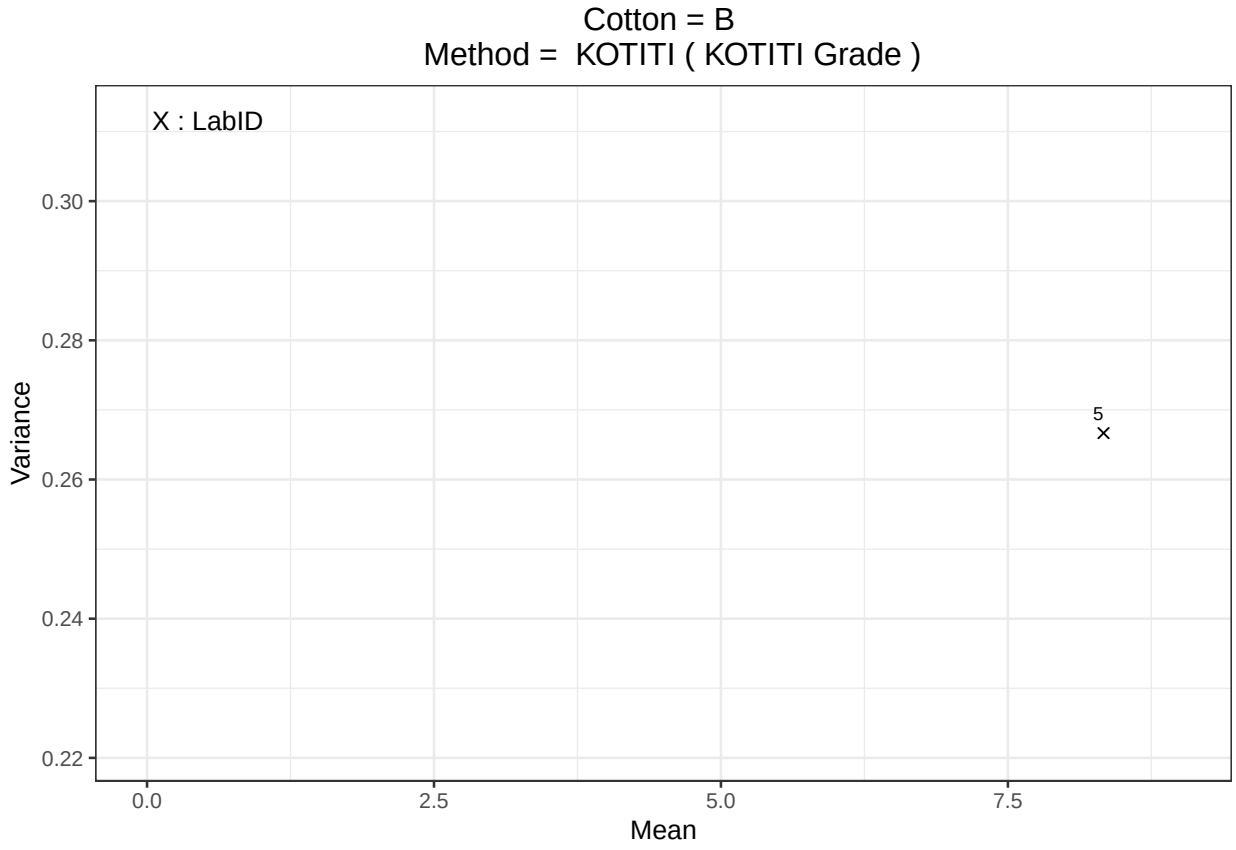


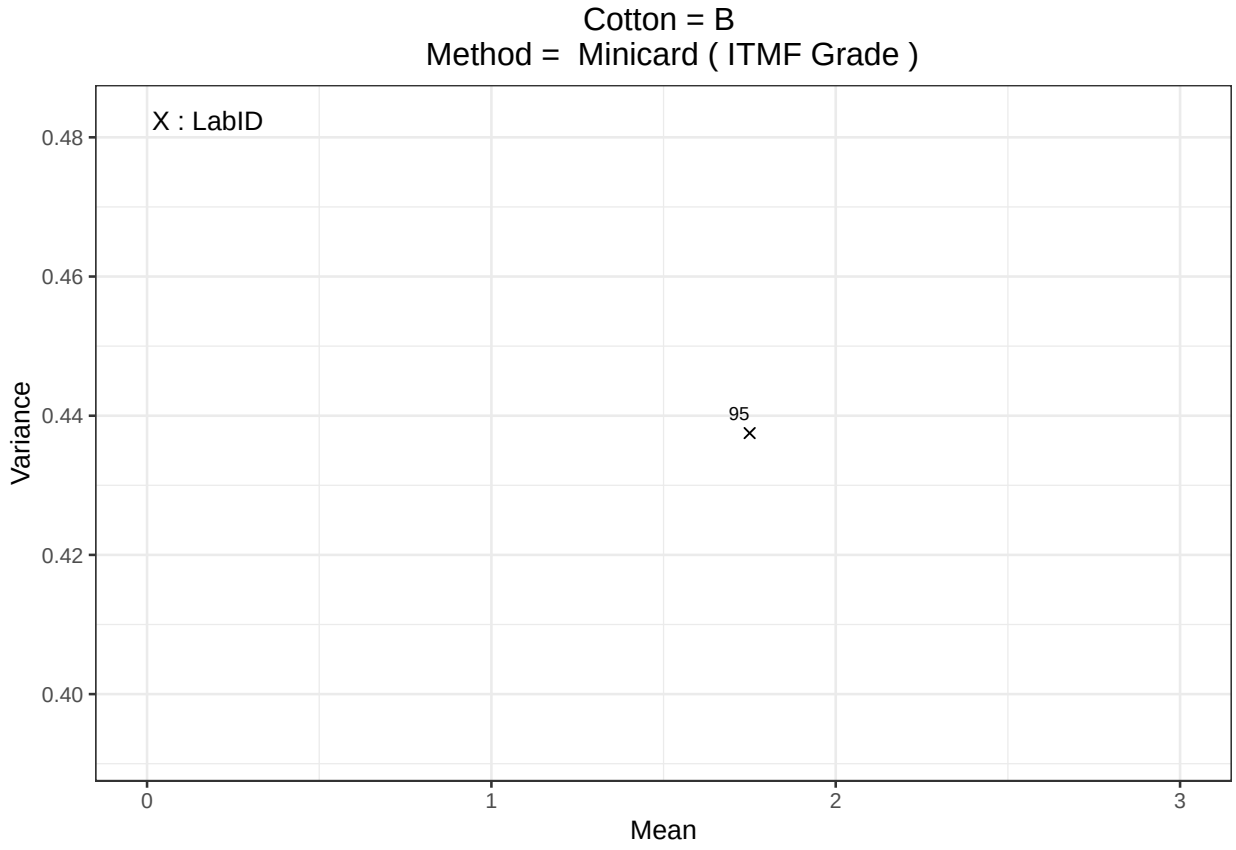
[1] "For Cotton = B and for method = Caramelization , 2 LabID (LabID being , 20, 30) cannot be shown on this chart as only one measurement was performed and, therefore, a variance cannot be calculated in this case."

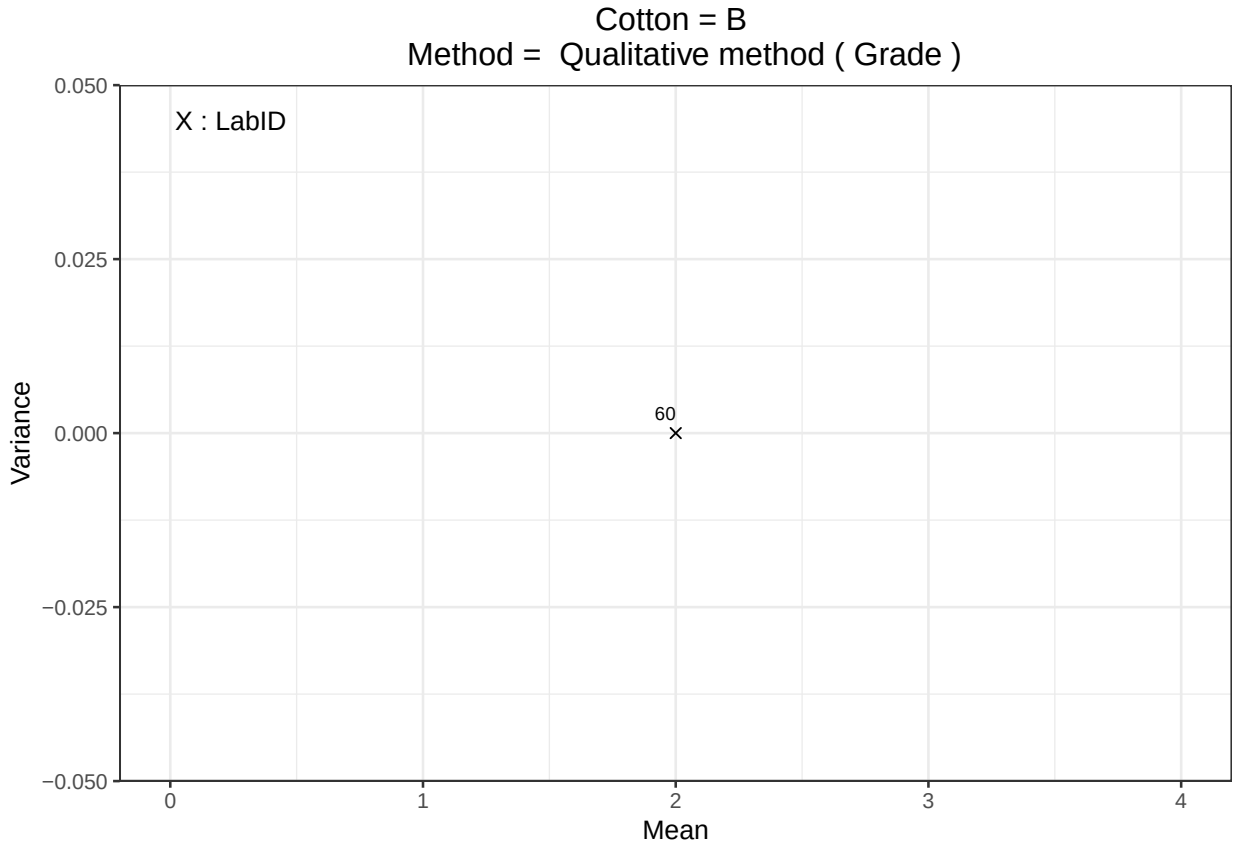

Cotton = B
Method = Contest−S (C/F Grade)
X : LabID
35
90
85
30000
20000
10000
Variance
0
200
400
600
Mean

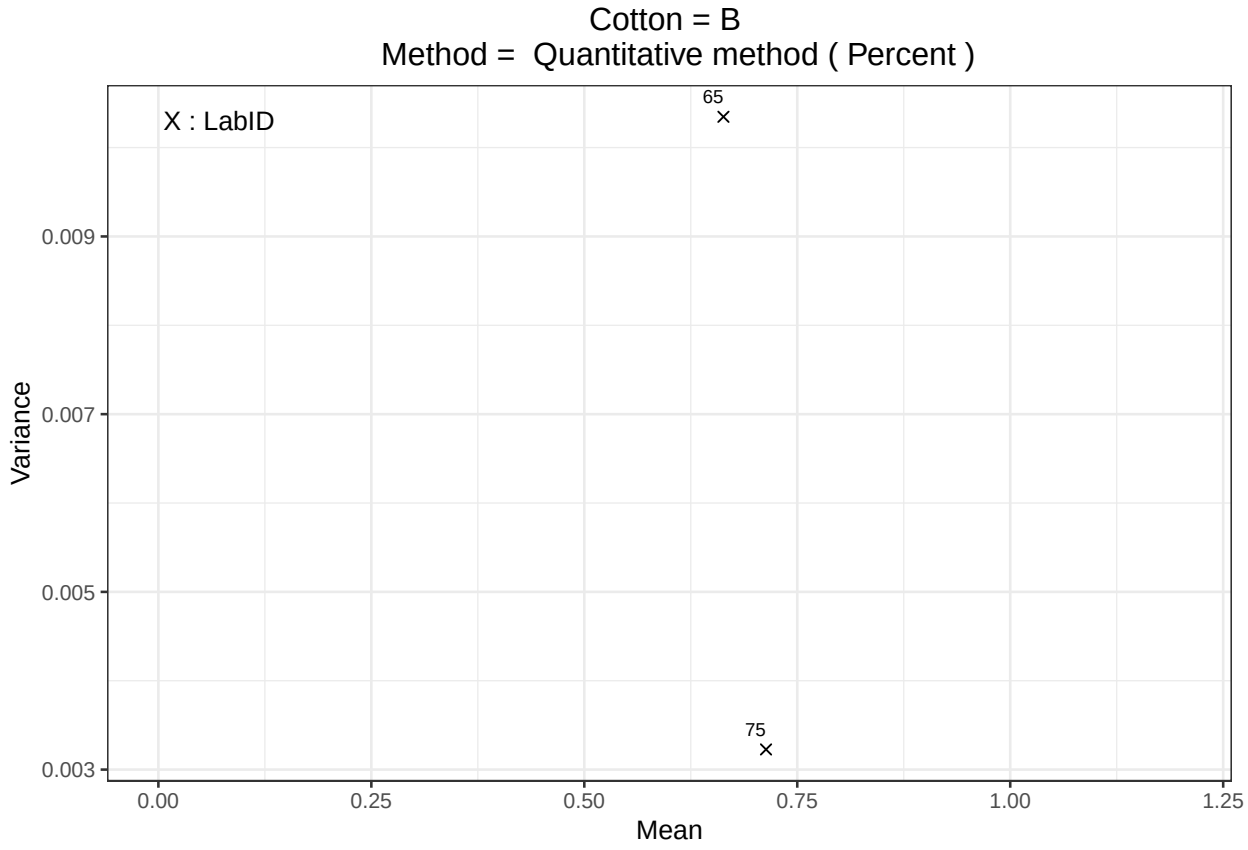

Cotton = B
Method = H2SD (Sticky points)
X : LabID
105
45
50
75
50
25
Variance
0
20
40
60
Mean

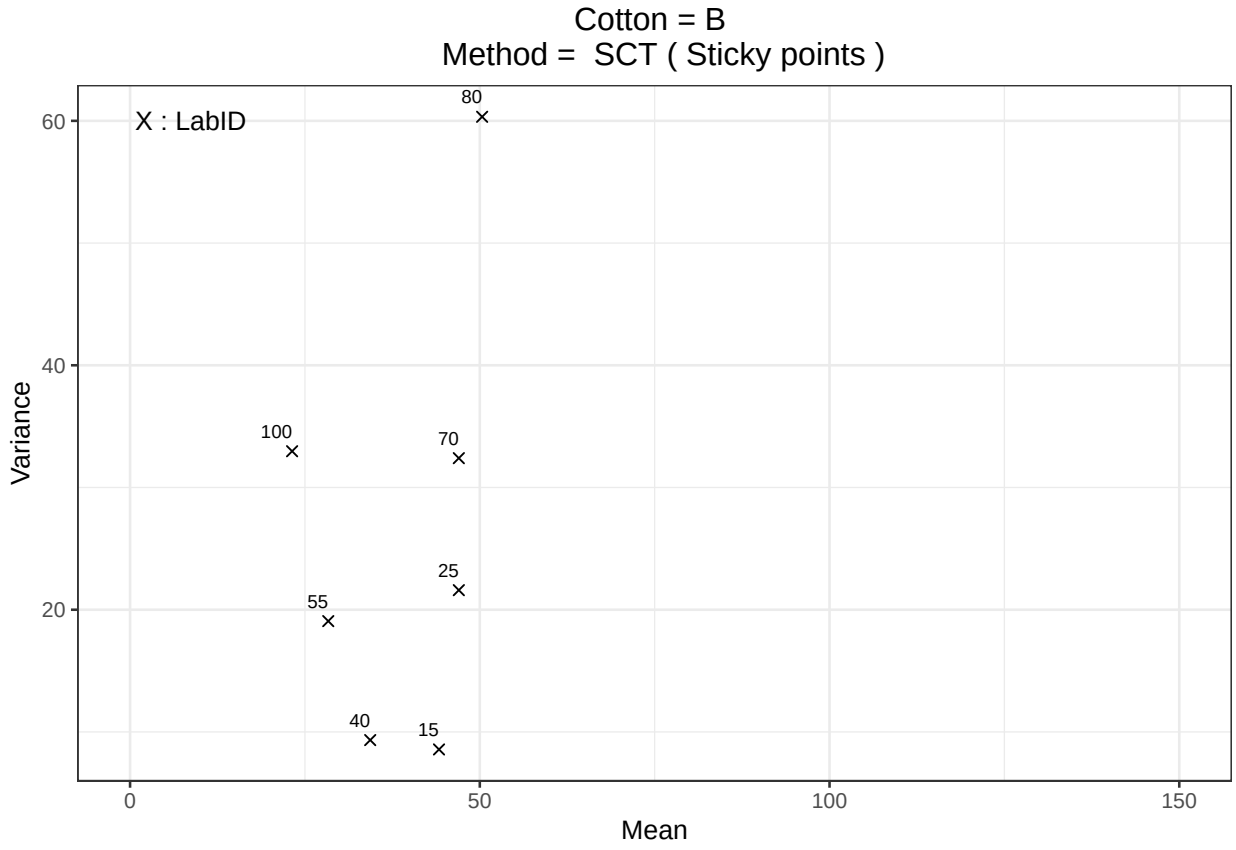

Cotton = B
Method = HSI−NIR (Sticky points)
X : LabID
110
Variance
14.30
14.28
14.26
14.24
14.22
0
50
100
150
Mean


Cotton = B
Method = KOTITI (KOTITI Grade)
X : LabID
0.30
0.28
0.26
0.24
0.22
Variance
5
0.0
2.5
5.0
7.5
Mean

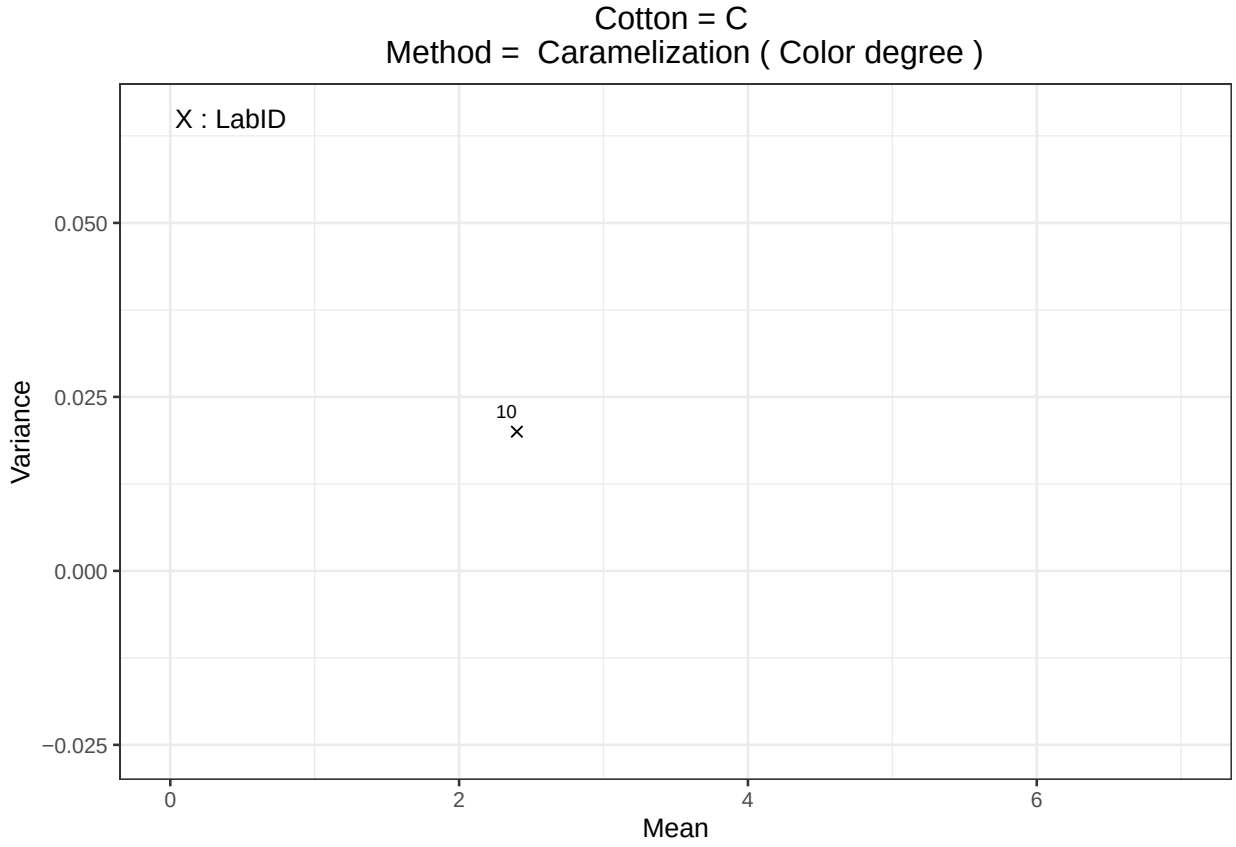

Cotton = B
Method = Minicard (ITMF Grade)
X : LabID
0.48
0.46
0.44
0.42
0.40
Variance
95
0
1
2
3
Mean


Cotton = B
Method = Qualitative method (Grade)
X : LabID
60
Variance
Mean
0.050
0.025
0.000
−0.025
−0.050
0
1
2
3
4

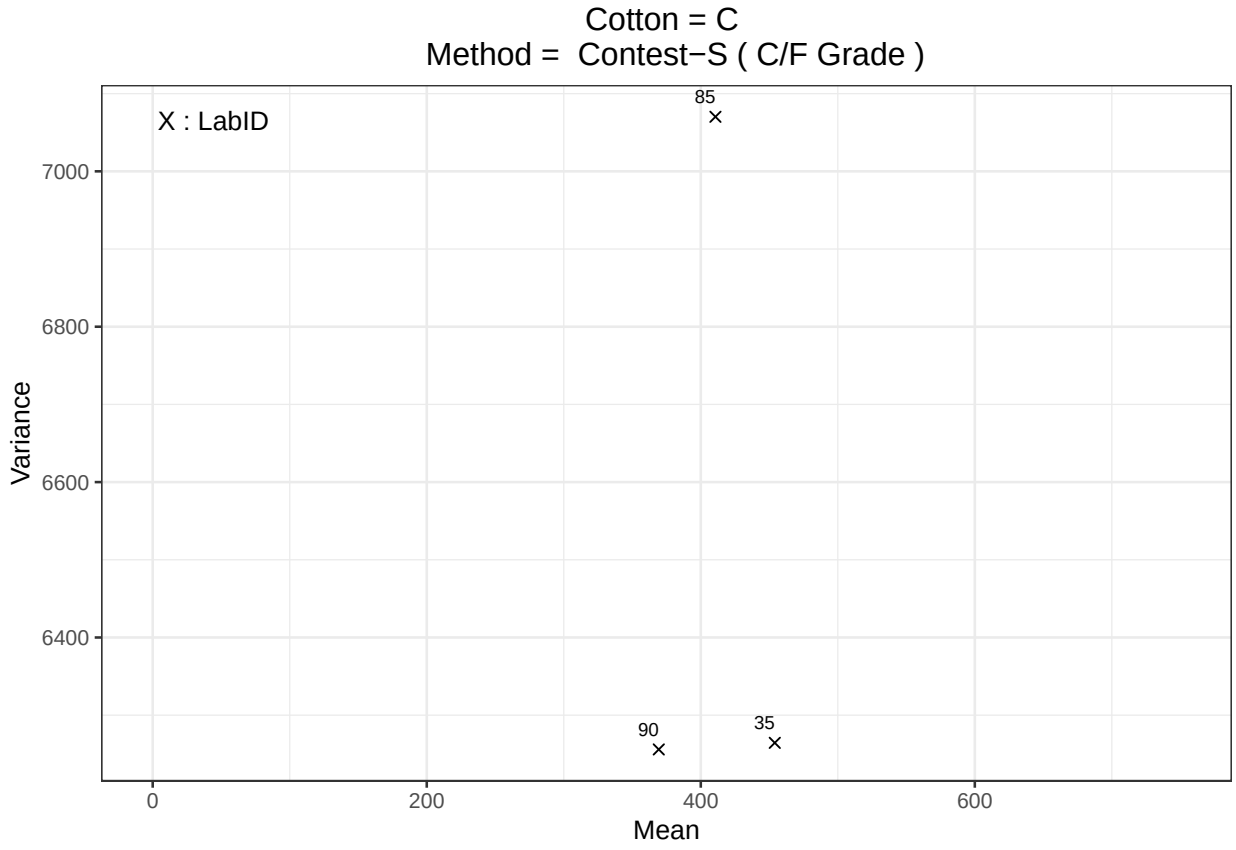

Cotton = B
Method = Quantitative method (Percent)
X : LabID
65
75
Variance
0.009
0.007
0.005
0.003
0.00
0.25
0.50
0.75
1.00
1.25
Mean

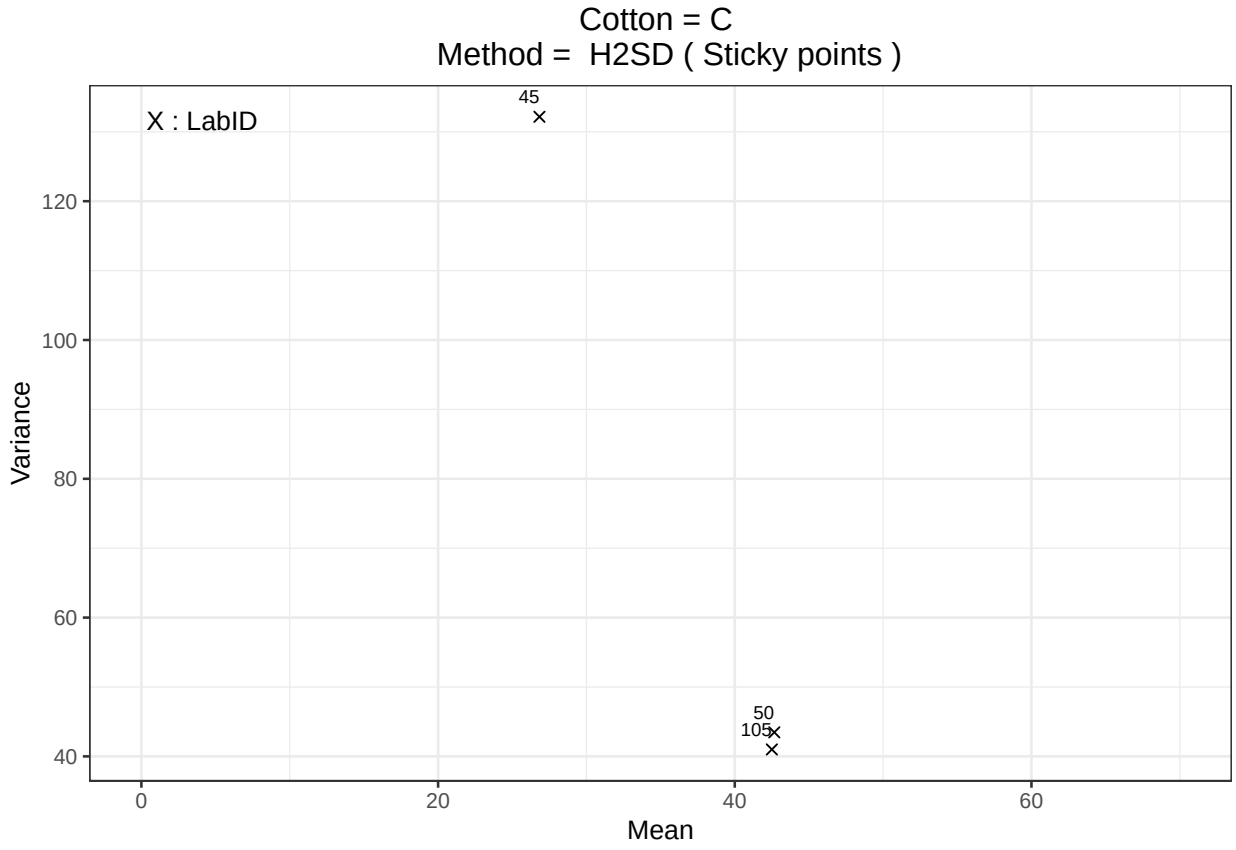

Cotton = B
Method = SCT (Sticky points)
X : LabID
80
100
70
25
55
40
15
Variance
Mean
60
40
20
0
50
100
150

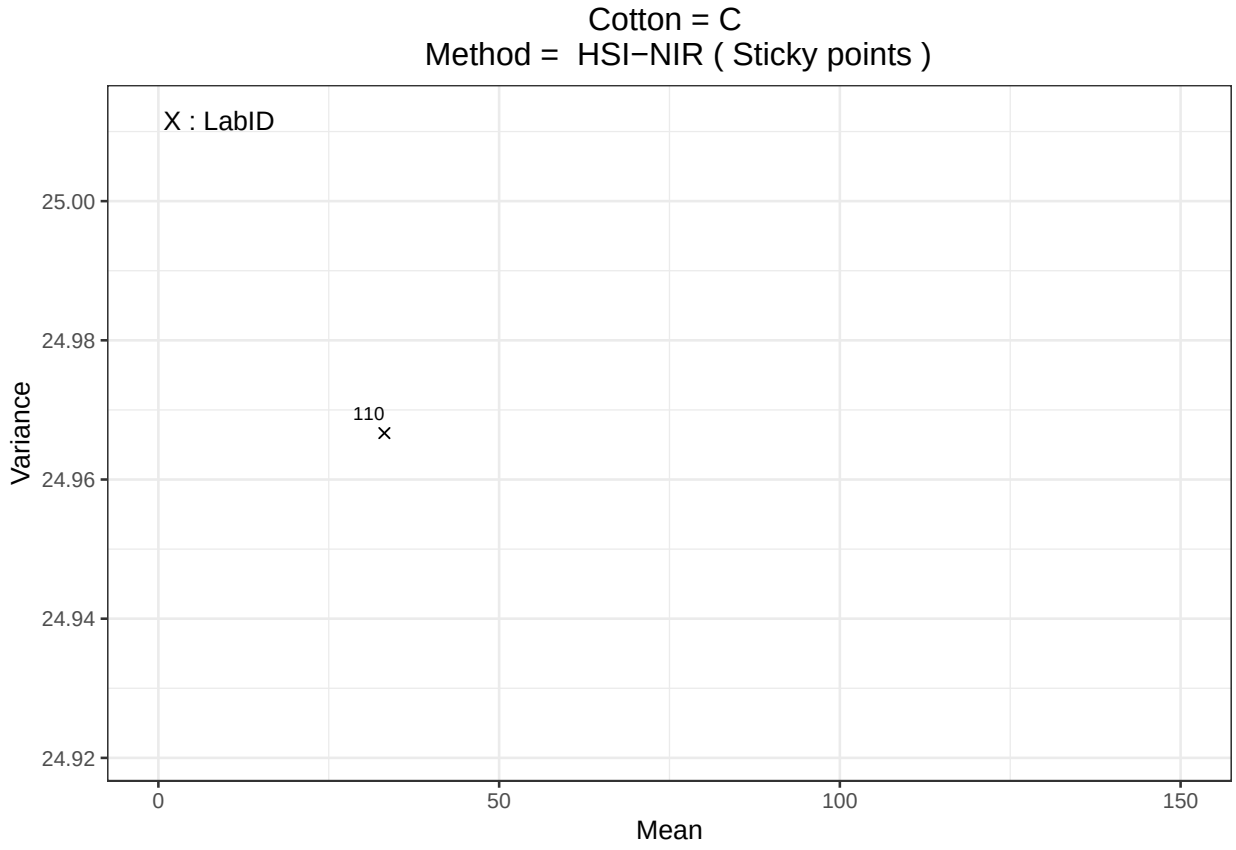
Cotton C : Variance between individual measurements = f(Mean) for all concerned labs

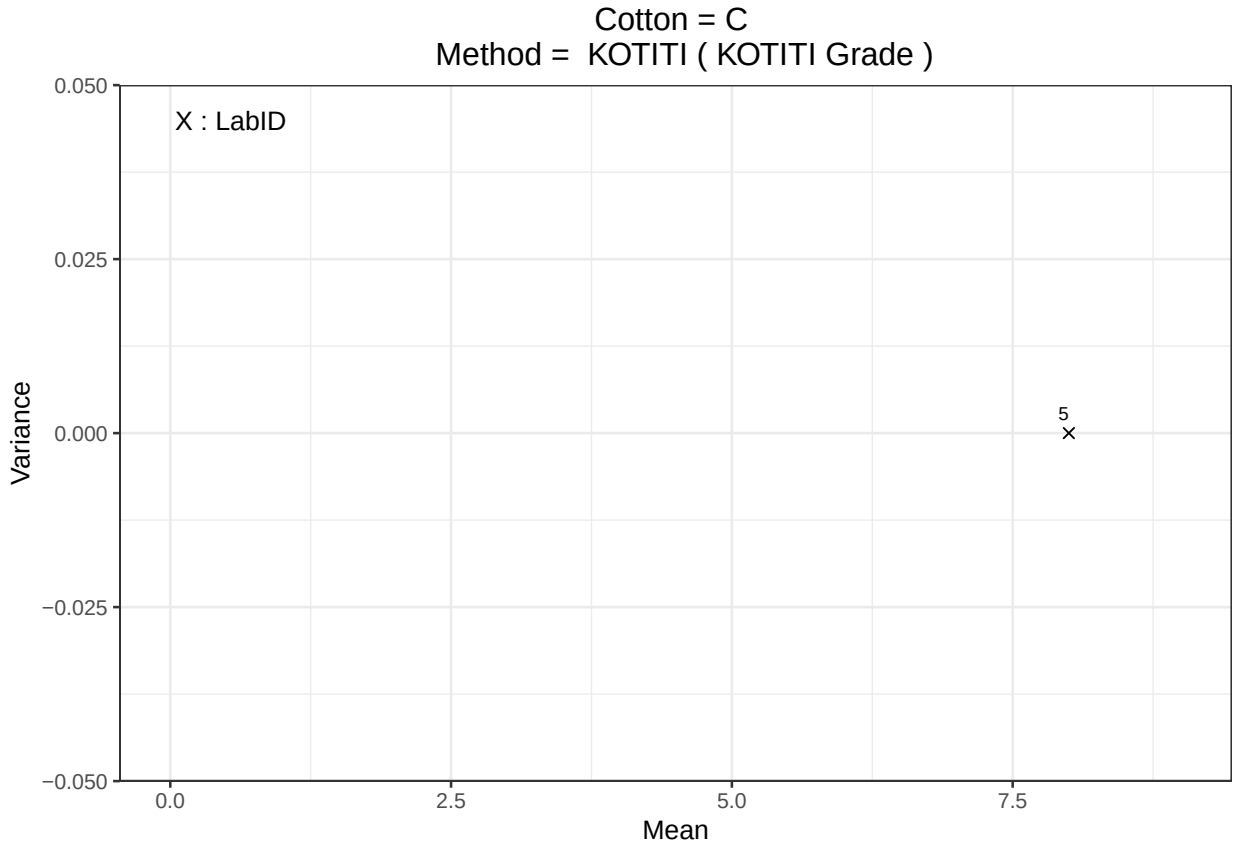


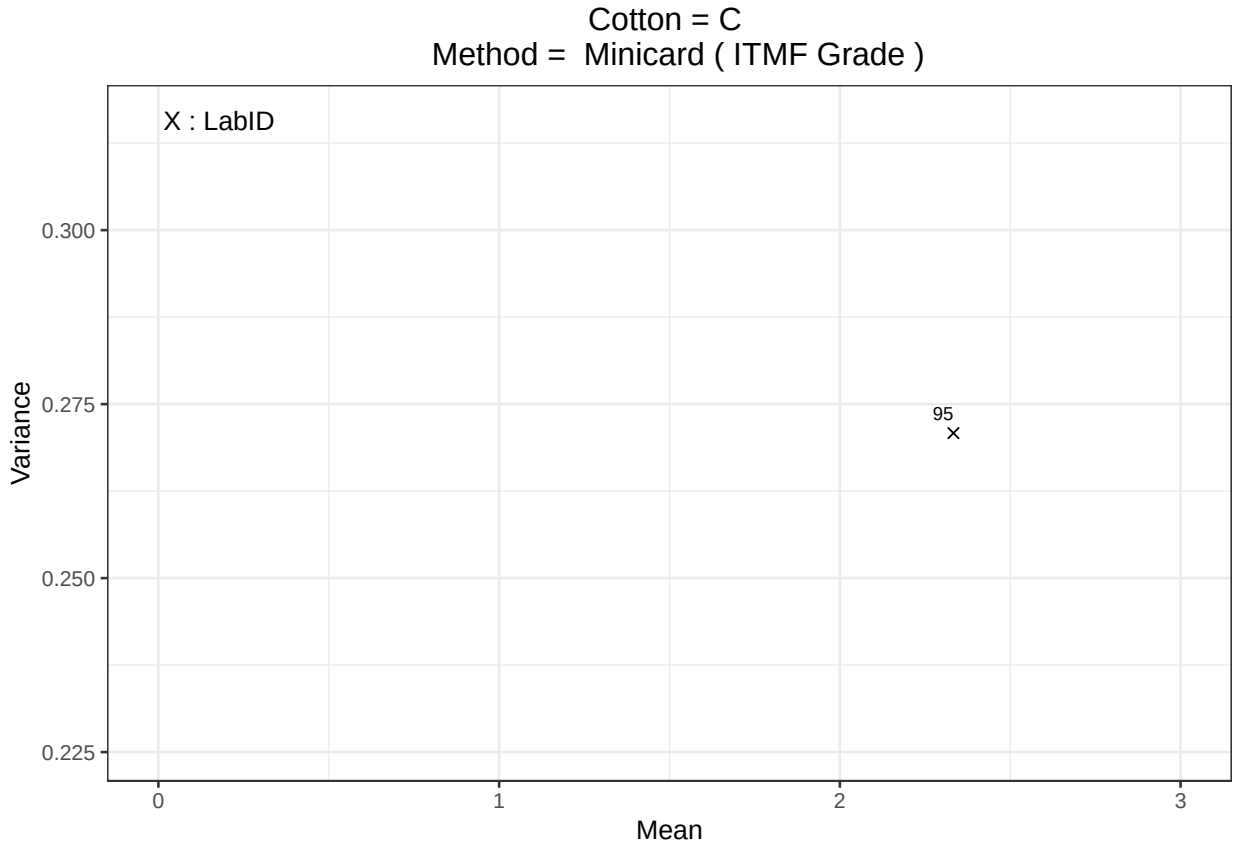
[1] "For Cotton = C and for method = Caramelization , 2 LabID (LabID being , 20, 30) cannot be shown on this chart as only one measurement was performed and, therefore, a variance cannot be calculated in this case."

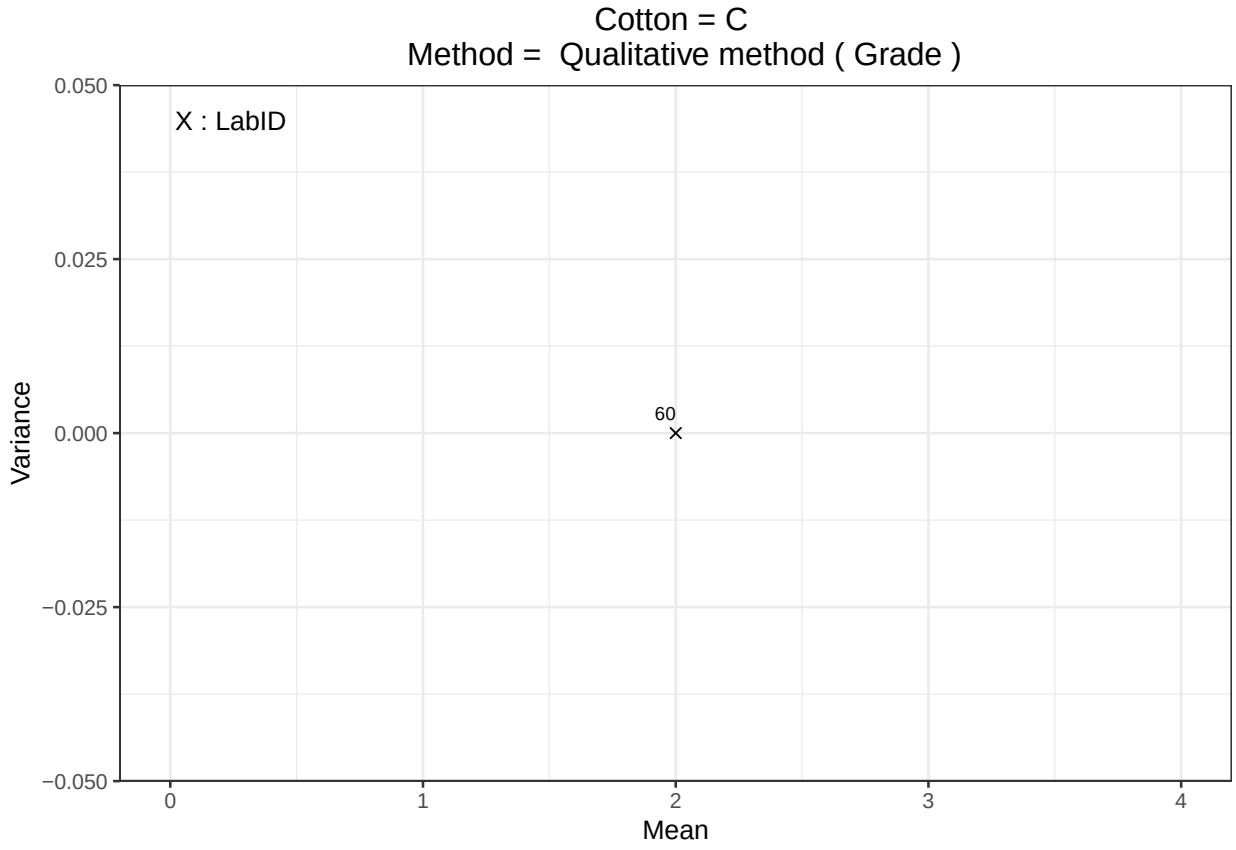

Cotton = C
Method = Contest−S (C/F Grade)
X : LabID
85
90
35
7000
6800
6600
6400
Variance
0
200
400
600
Mean

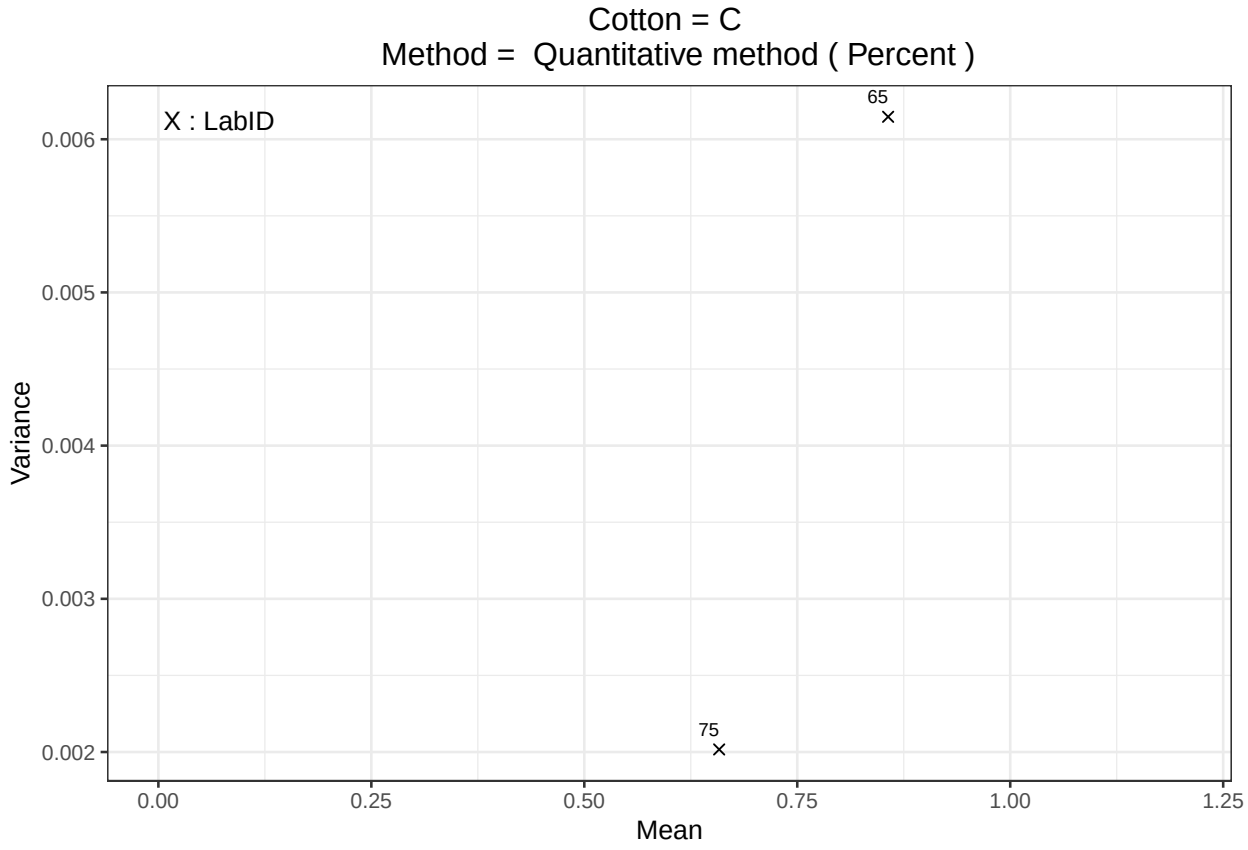

Cotton = C
Method = H2SD (Sticky points)
X : LabID
45
50
105
Variance
Mean
120
100
80
60
40
0
20
40
60

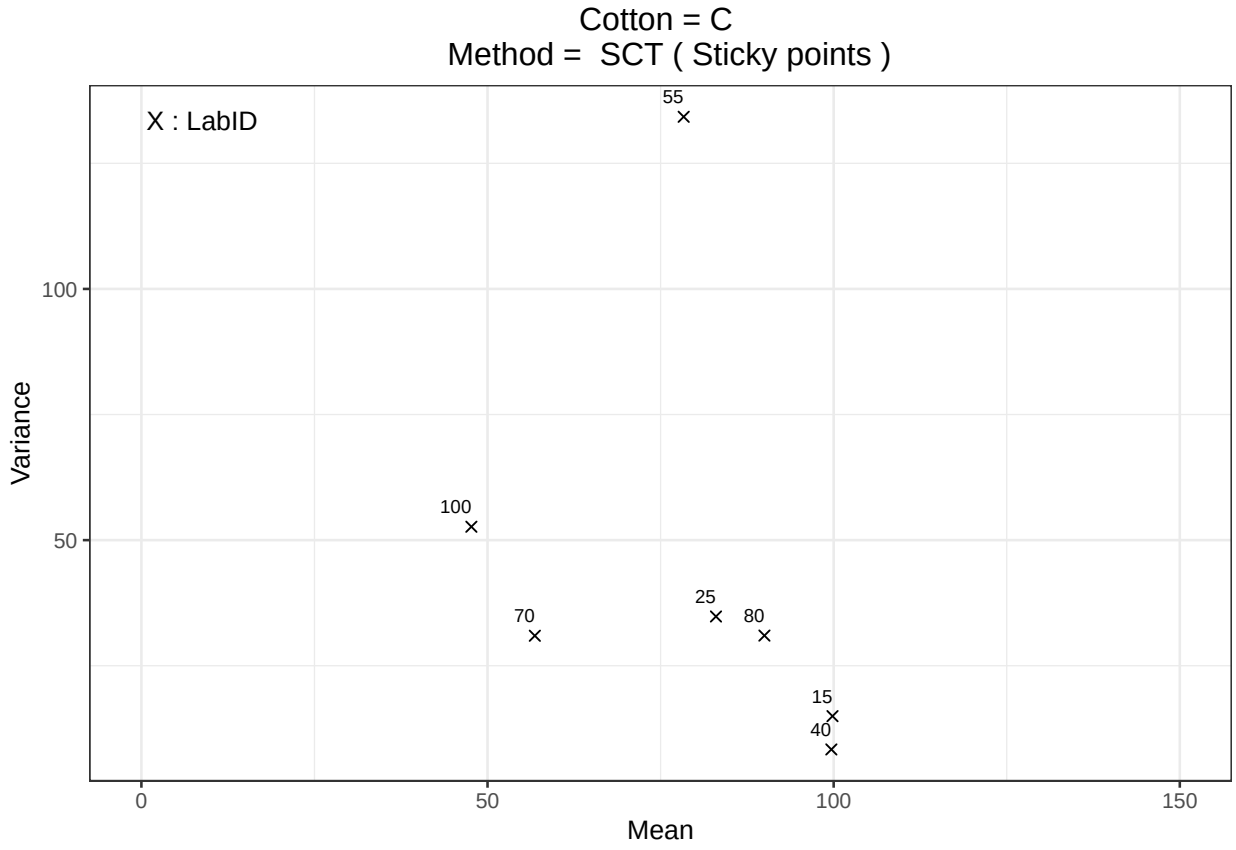

Cotton = C
Method = HSI−NIR (Sticky points)
X : LabID
25.00
24.98
24.96
24.94
24.92
Variance
110
0
50
100
150
Mean


Cotton = C
Method = KOTITI (KOTITI Grade)
X : LabID
0.050
0.025
0.000
−0.025
−0.050
Variance
0.0
2.5
5.0
7.5
Mean
5

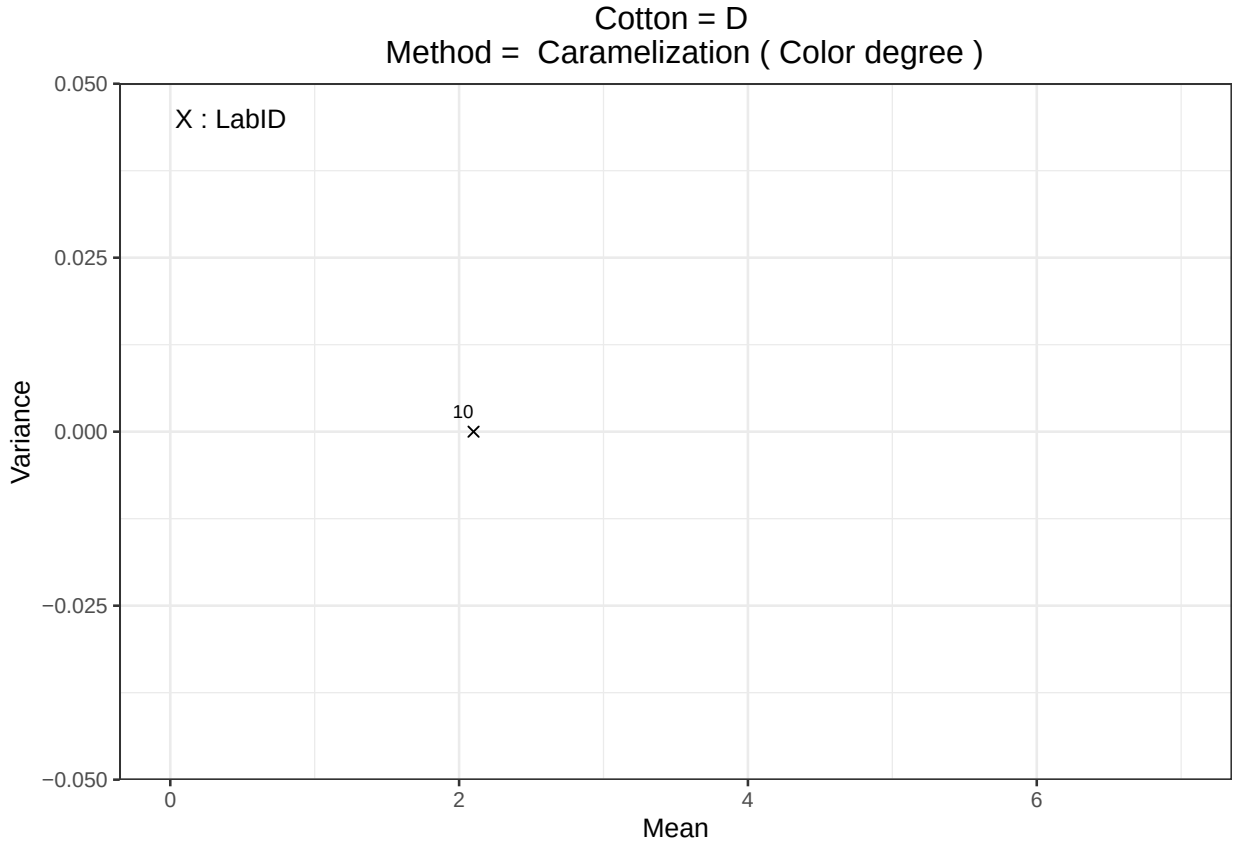

Cotton = C
Method = Minicard (ITMF Grade)
X : LabID
0.300
0.275
0.250
0.225
Variance
95
0
1
2
3
Mean


Cotton = C
Method = Qualitative method (Grade)
X : LabID
60
Variance
Mean
0.050
0.025
0.000
−0.025
−0.050
0
1
2
3
4

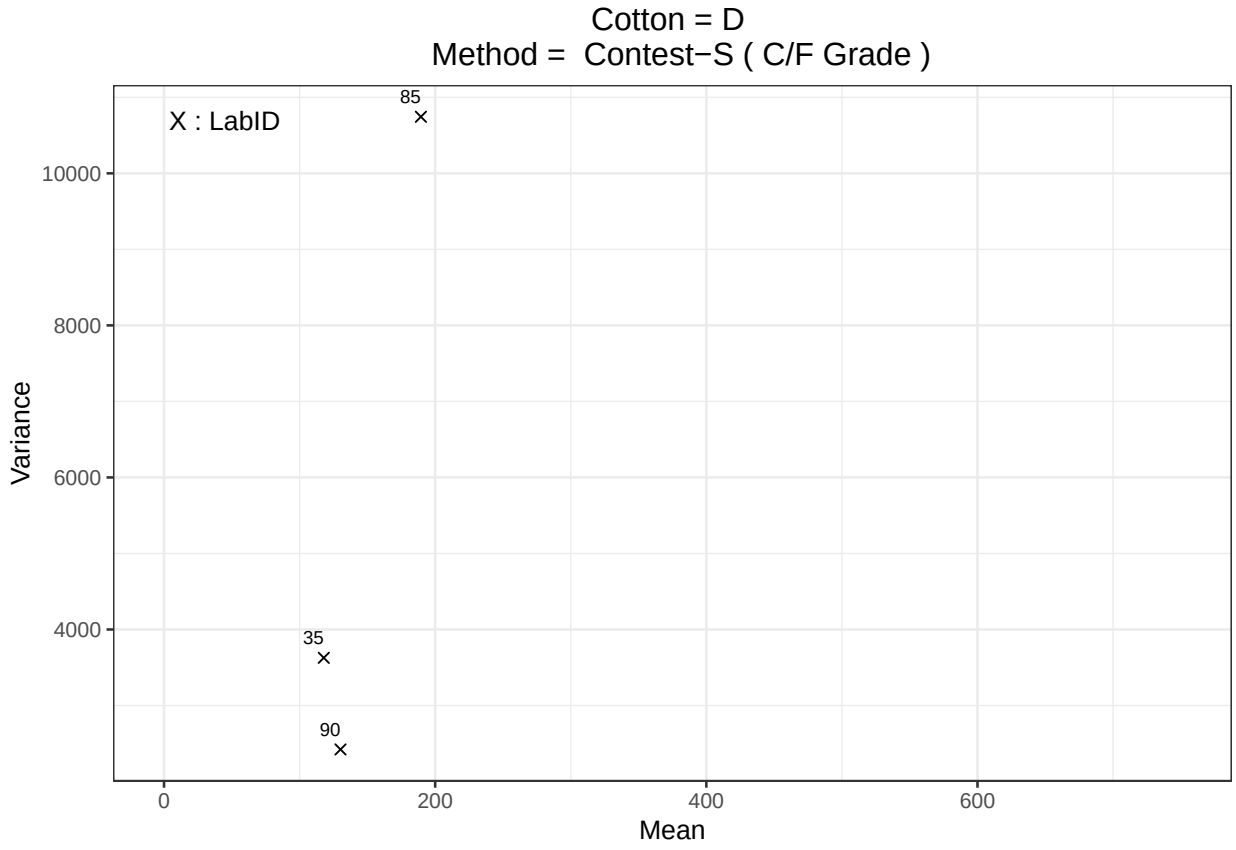

Cotton = C
Method = Quantitative method (Percent)
X : LabID
65
75
0.006
0.005
0.004
0.003
0.002
Variance
0.00
0.25
0.50
0.75
1.00
1.25
Mean

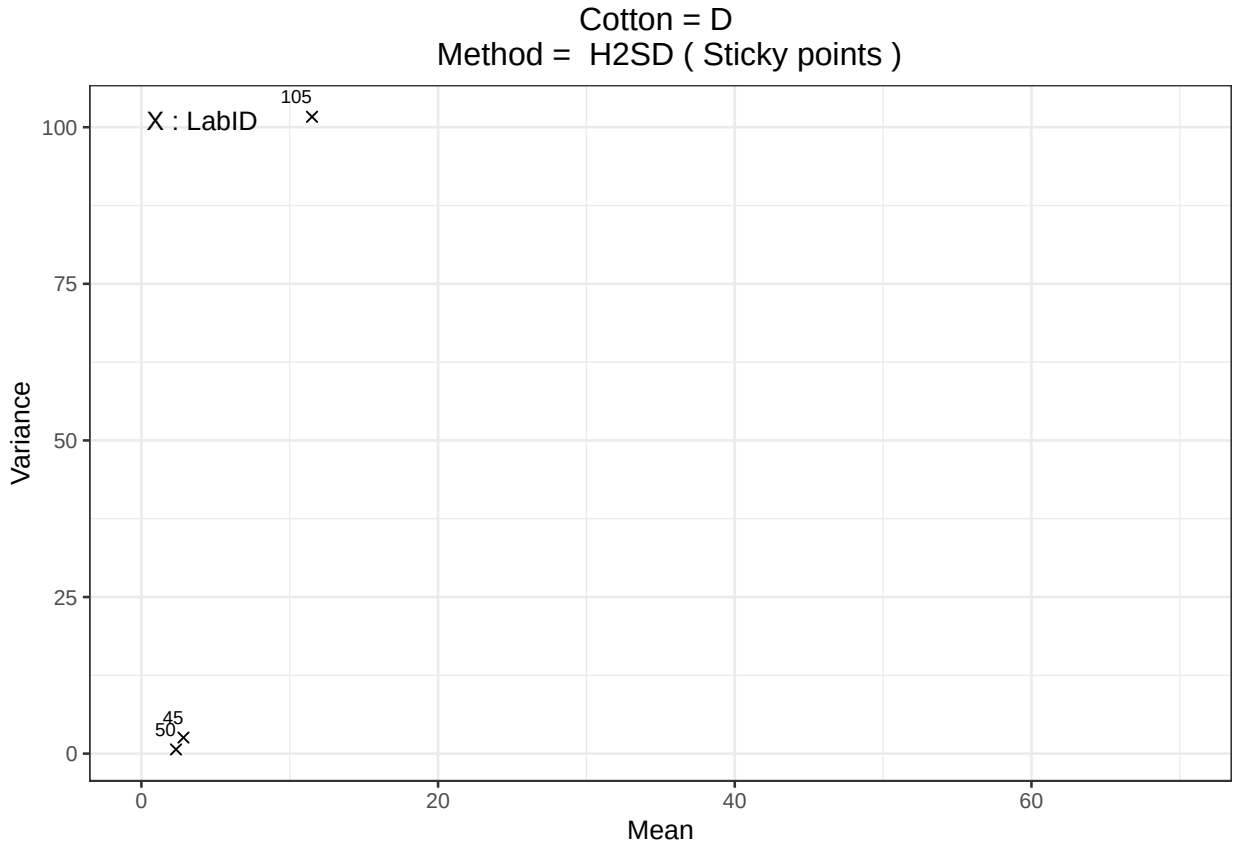

Cotton = C
Method = SCT (Sticky points)
X : LabID
55
100
25
80
70
15
40
Variance
Mean
0
50
100
150
50
100

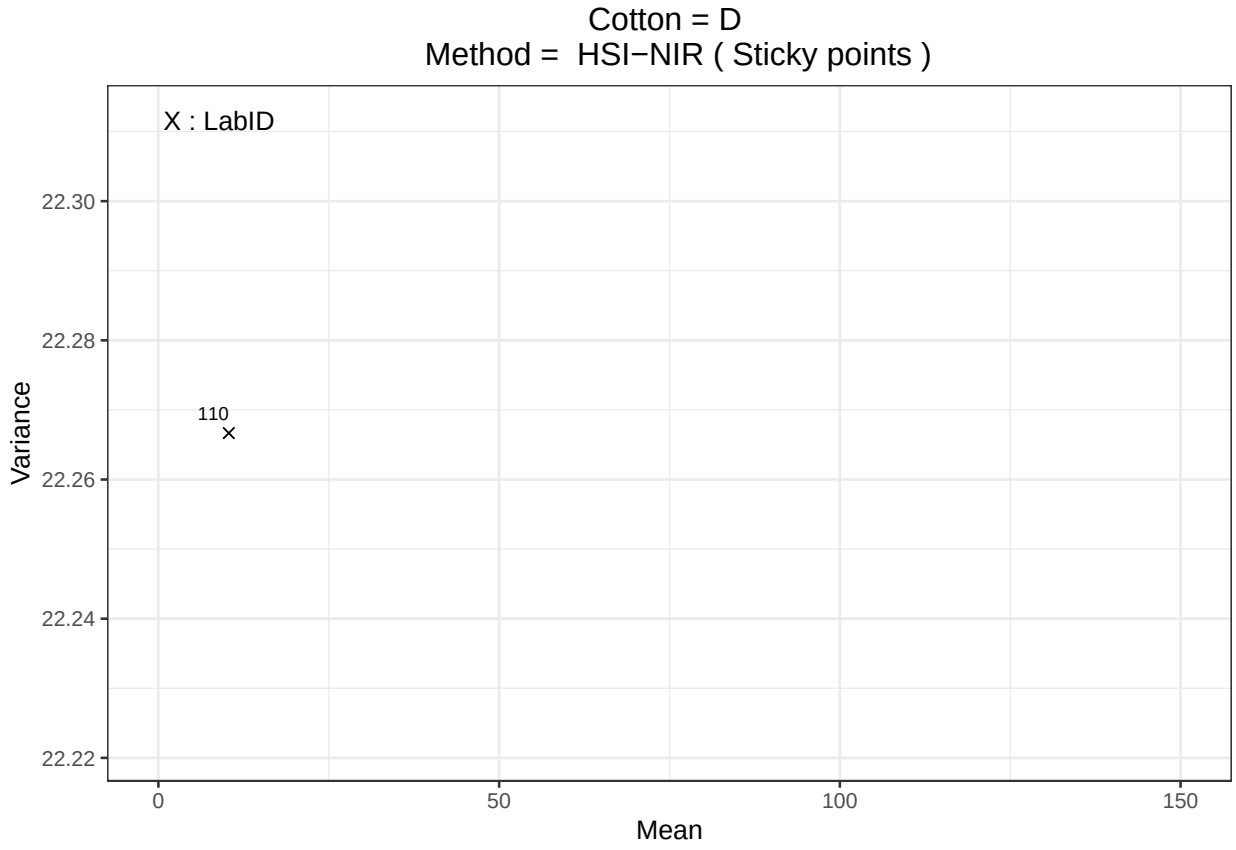
Cotton D : Variance between individual measurements = f(Mean) for all concerned labs

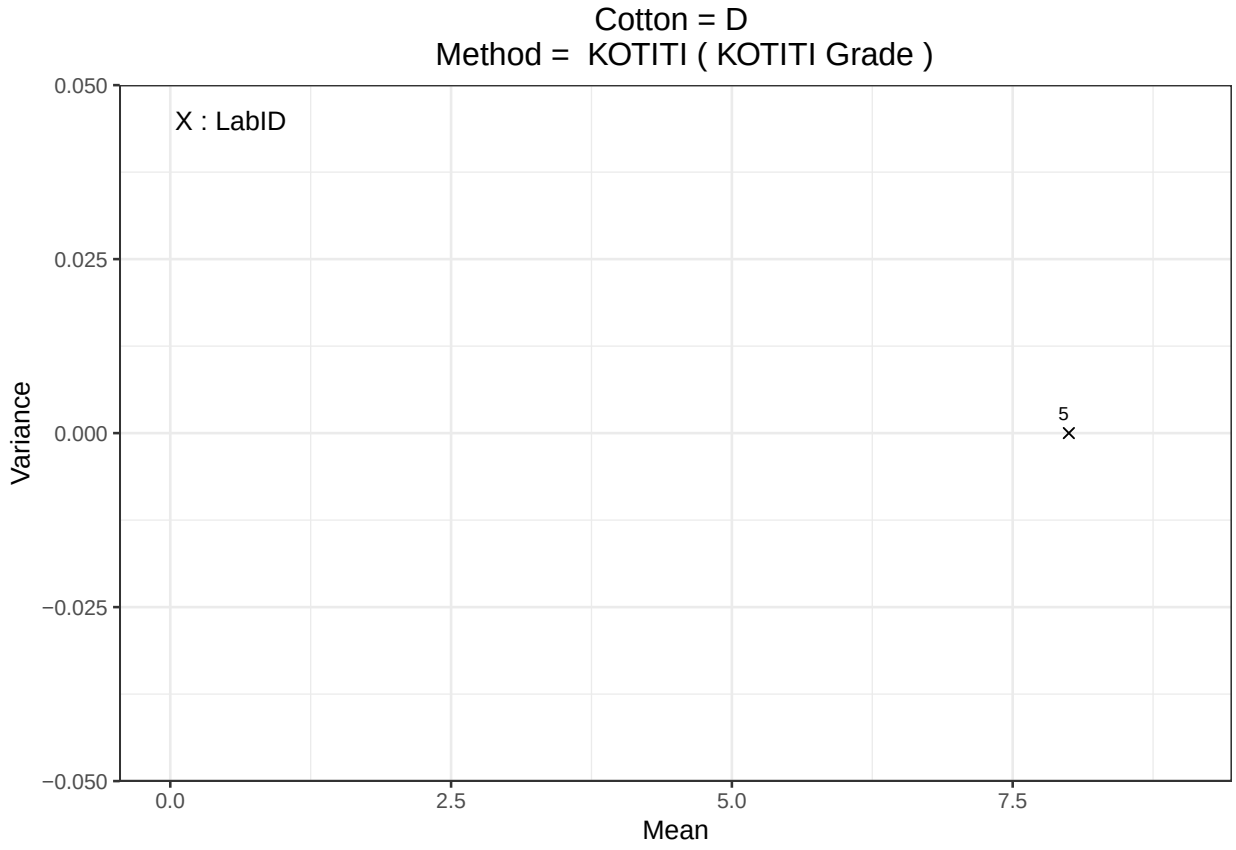


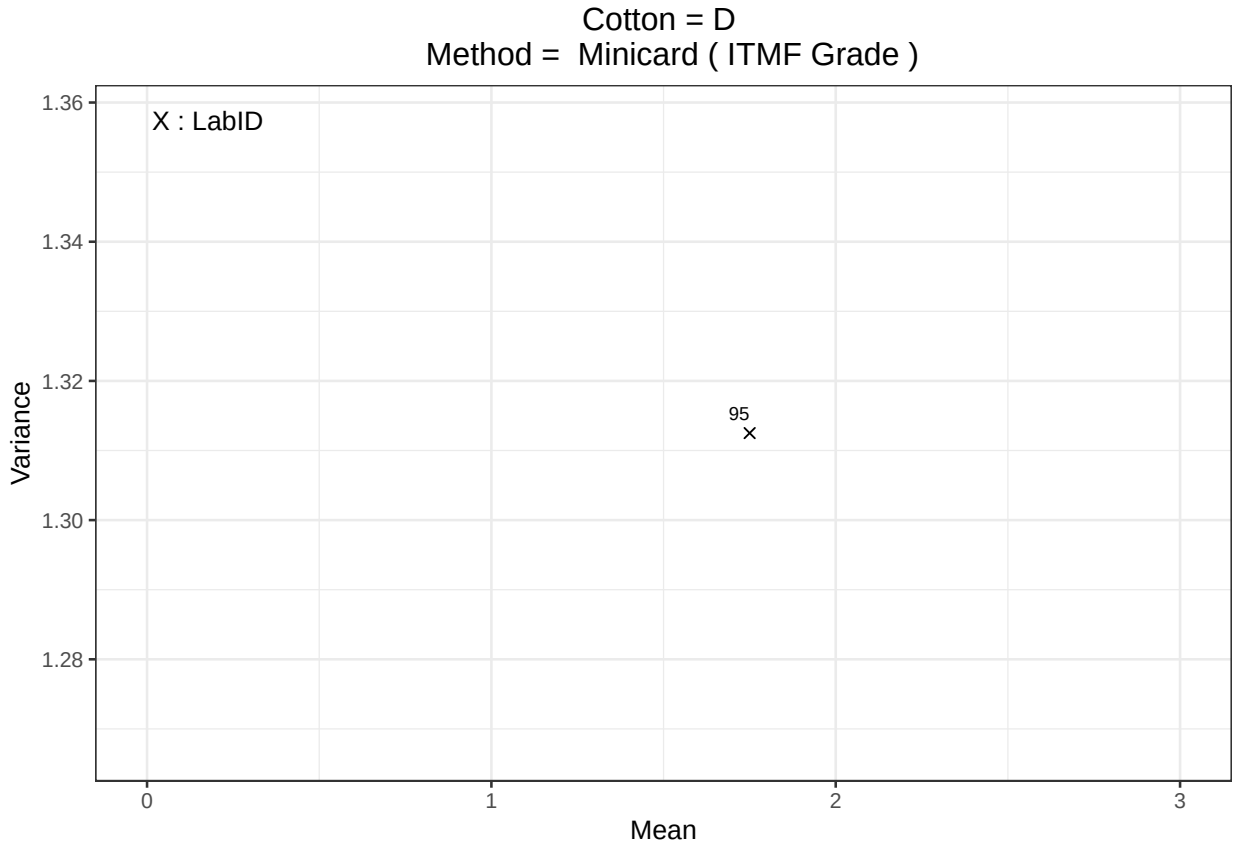
[1] "For Cotton = D and for method = Caramelization , 2 LabID (LabID being , 20, 30) cannot be shown on this chart as only one measurement was performed and, therefore, a variance cannot be calculated in this case."

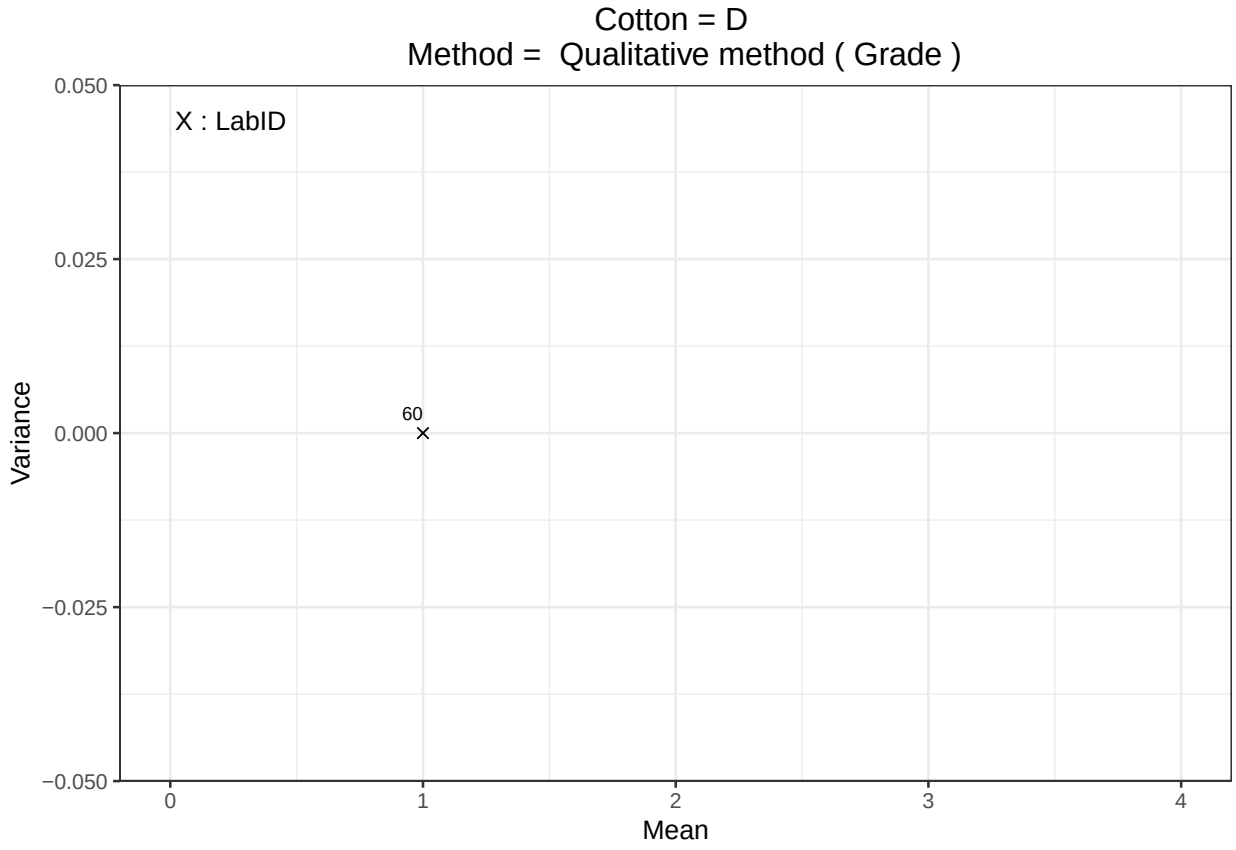

Cotton = D
Method = Contest−S (C/F Grade)
X : LabID
85
35
90
10000
8000
6000
4000
Variance
0
200
400
600
Mean

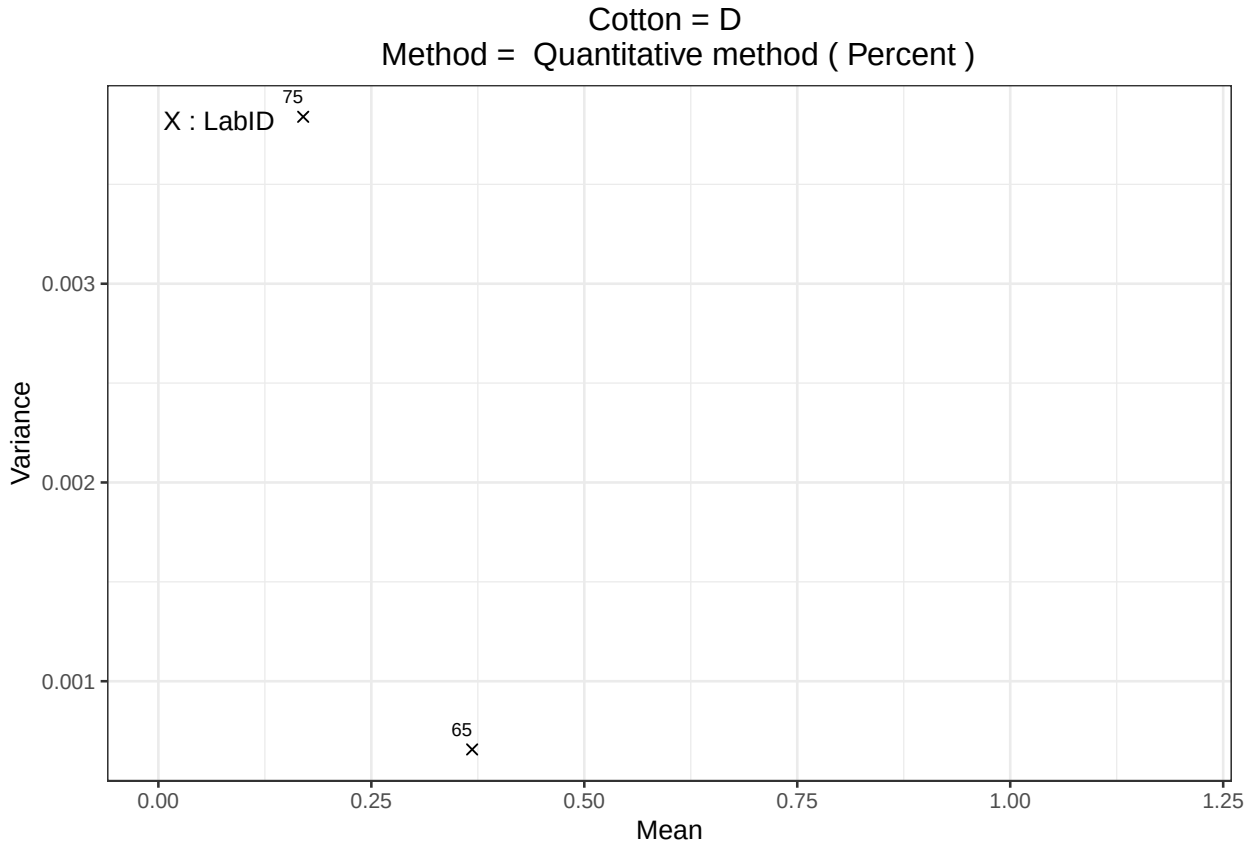

Cotton = D
Method = H2SD (Sticky points)
X : LabID
105
45
50
Variance
Mean
100
75
50
25
0
0
20
40
60

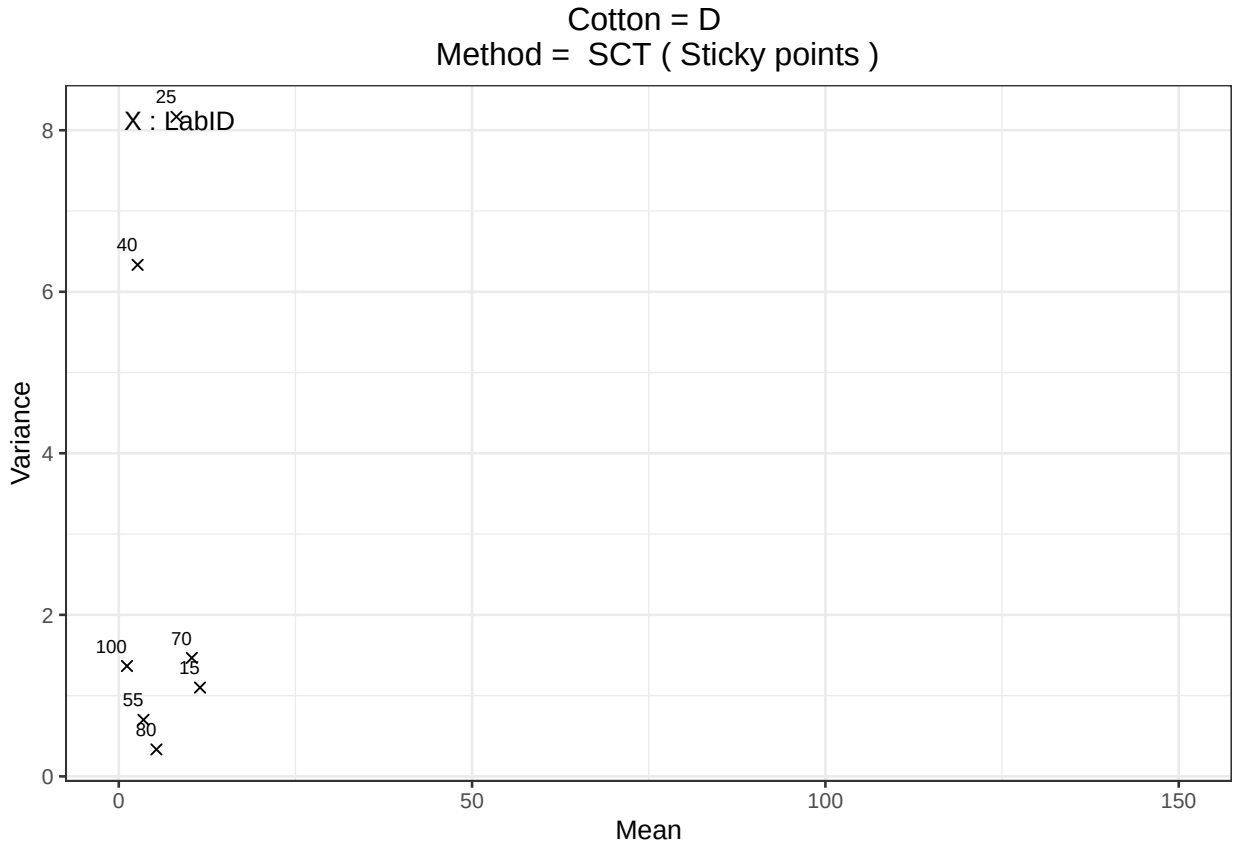

Cotton = D
Method = HSI−NIR (Sticky points)
X : LabID
22.30
22.28
22.26
22.24
22.22
Variance
110
0
50
100
150
Mean


Cotton = D
Method = KOTITI (KOTITI Grade)
X : LabID
0.050
0.025
0.000
−0.025
−0.050
Variance
5
0.0
2.5
5.0
7.5
Mean

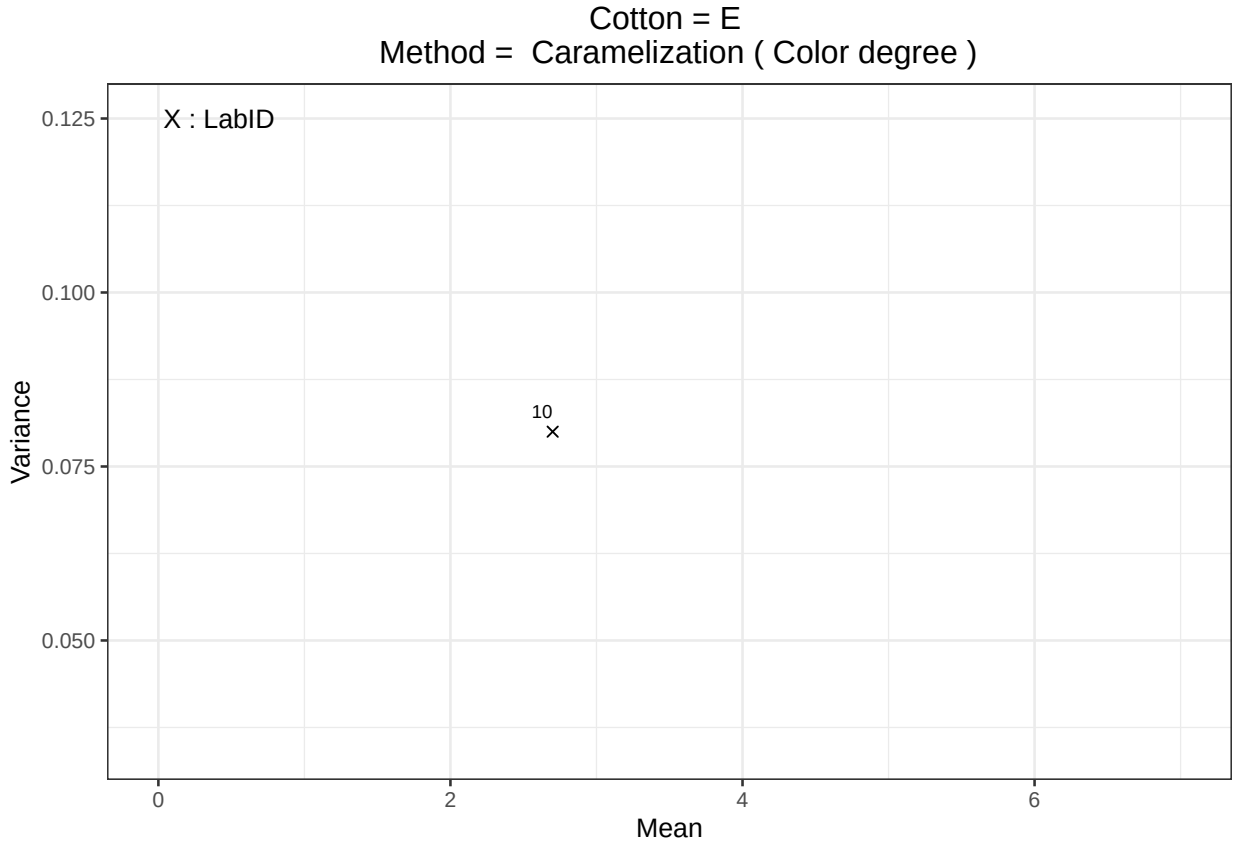

Cotton = D
Method = Minicard (ITMF Grade)
X : LabID
95
Variance
1.36
1.34
1.32
1.30
1.28
0
1
2
3
Mean


Cotton = D
Method = Qualitative method (Grade)
X : LabID
60
Variance
Mean
0.050
0.025
0.000
−0.025
−0.050
0
1
2
3
4

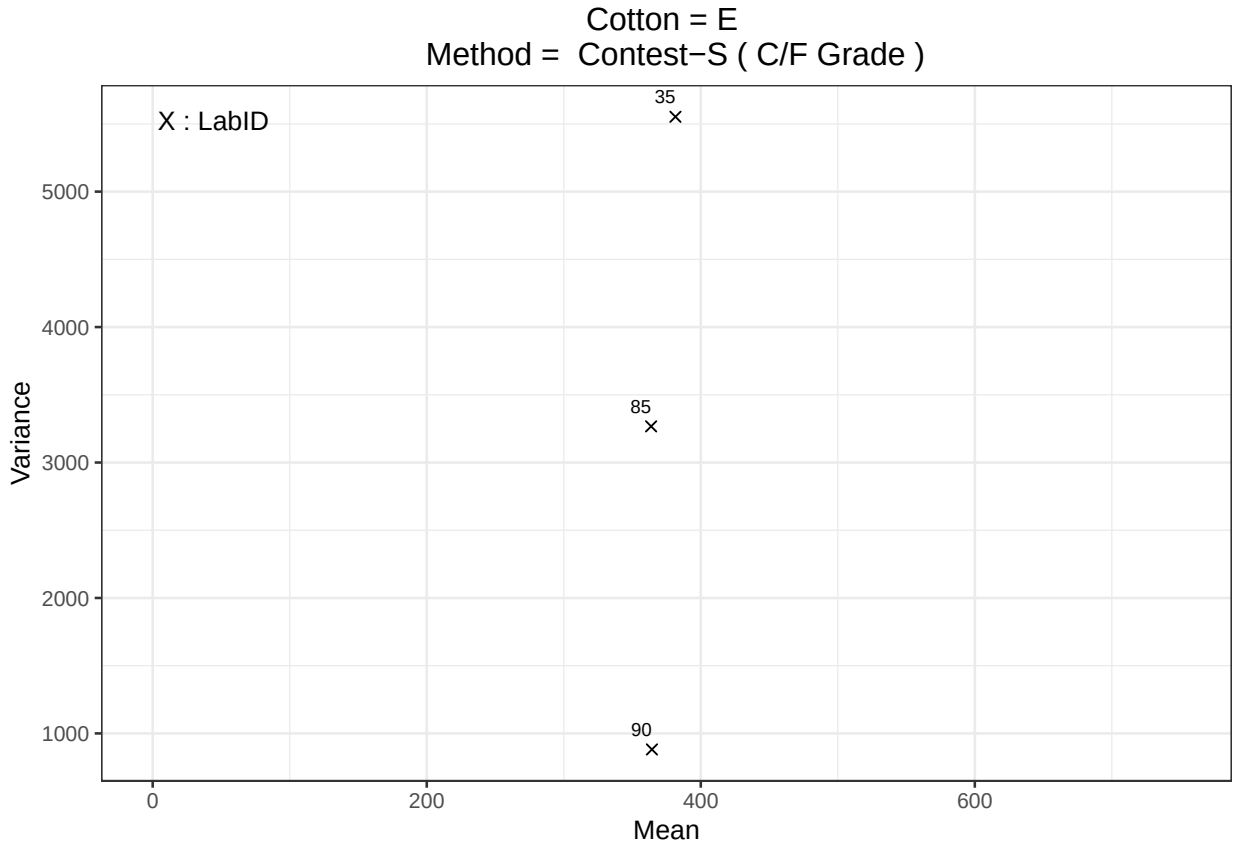

Cotton = D
Method = Quantitative method (Percent)
X : LabID
75
65
Variance
0.003
0.002
0.001
0.00
0.25
0.50
0.75
1.00
1.25
Mean

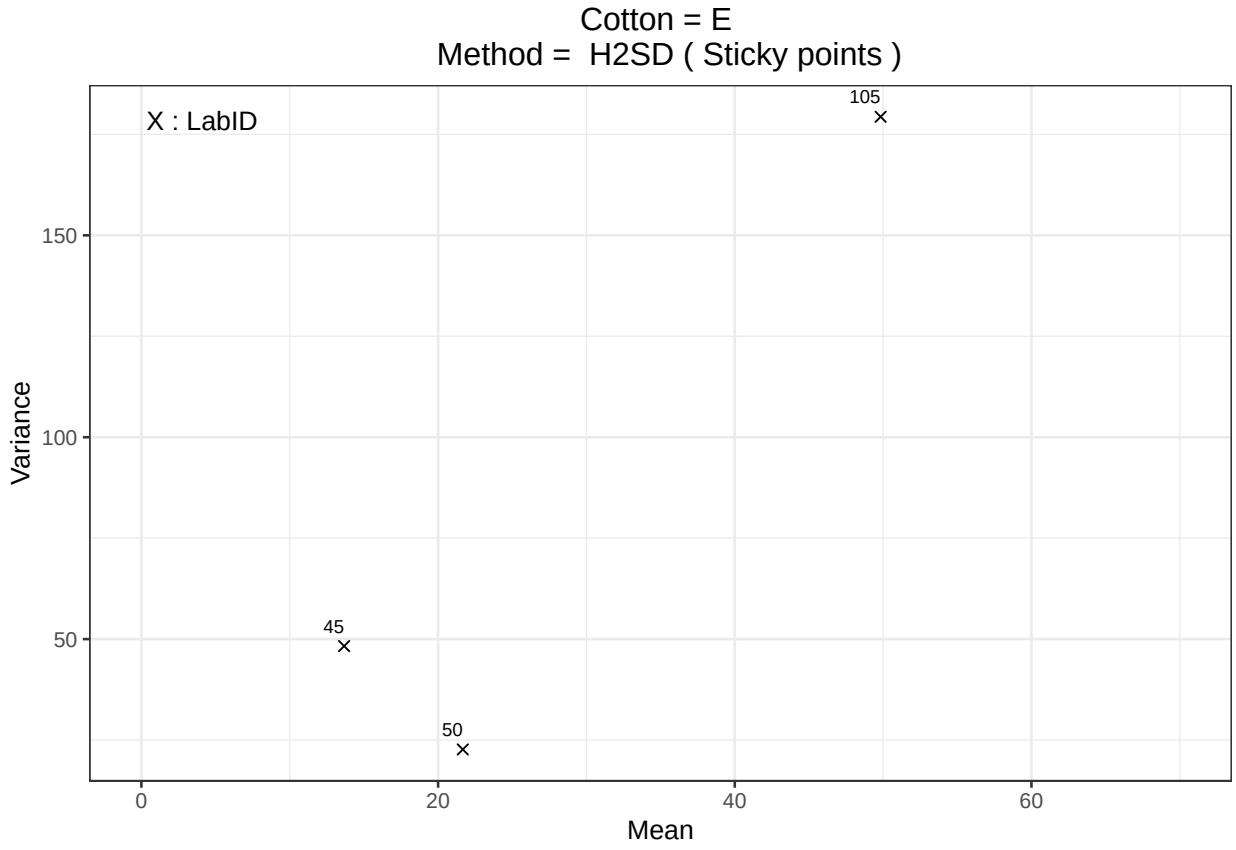

Cotton = D
Method = SCT (Sticky points)
X : LabID
Variance
Mean
0
2
4
6
8
0
50
100
150
25
40
100
70
15
55
80

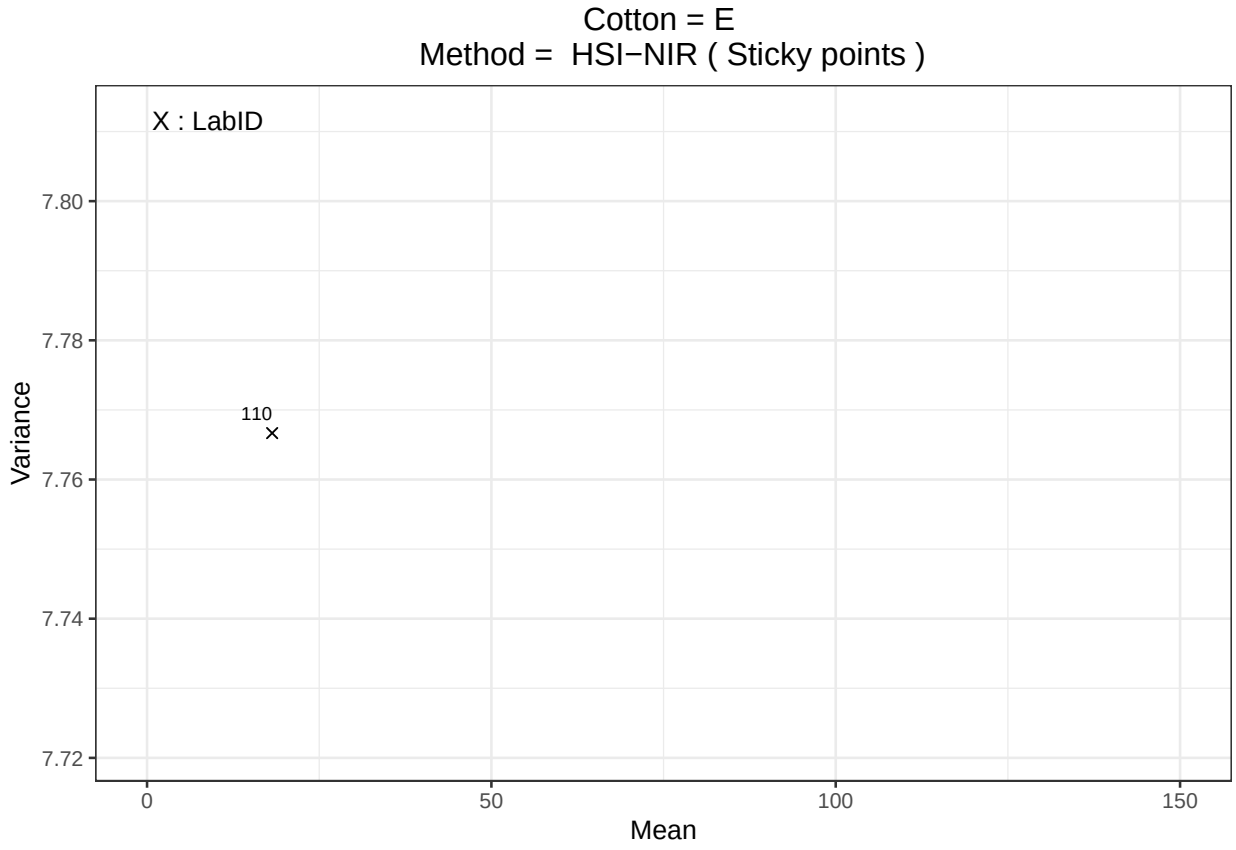
Cotton E : Variance between individual measurements = f(Mean) for all concerned labs

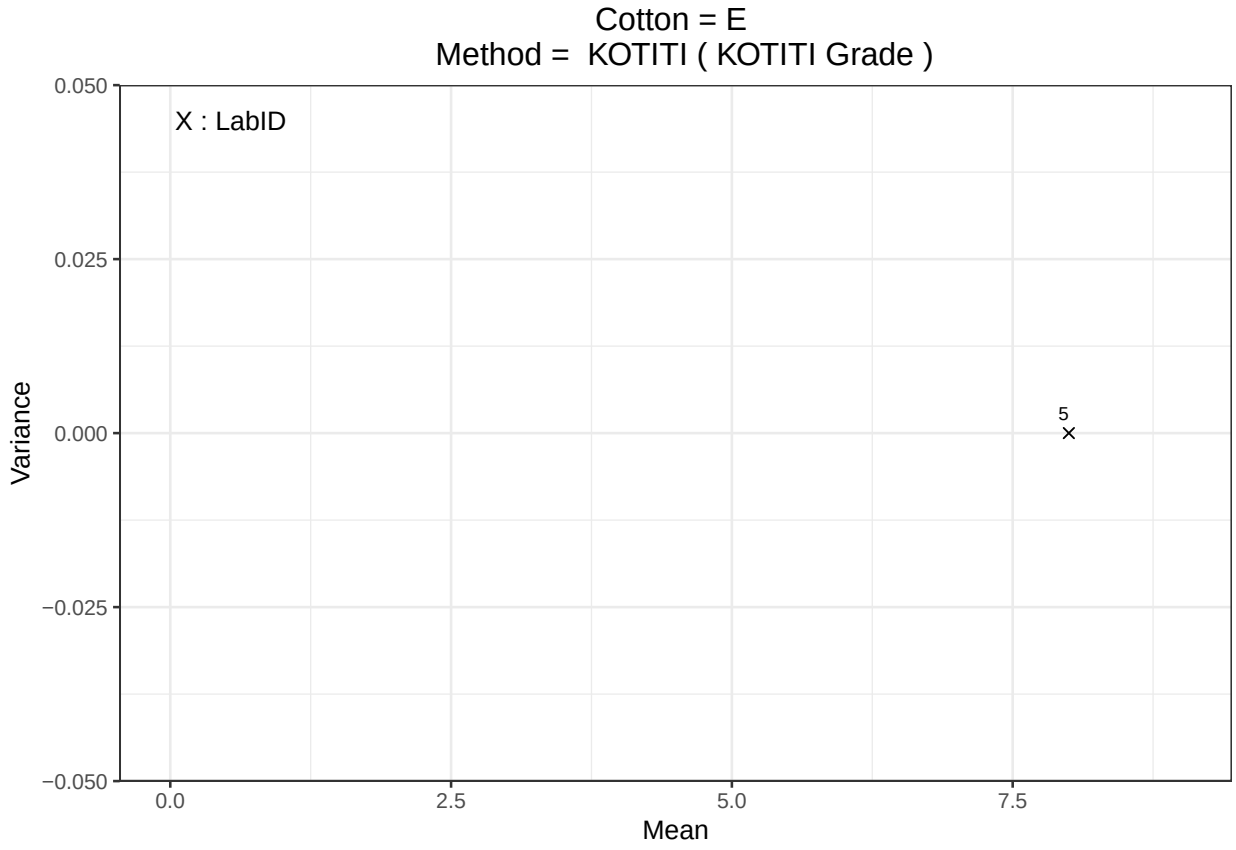


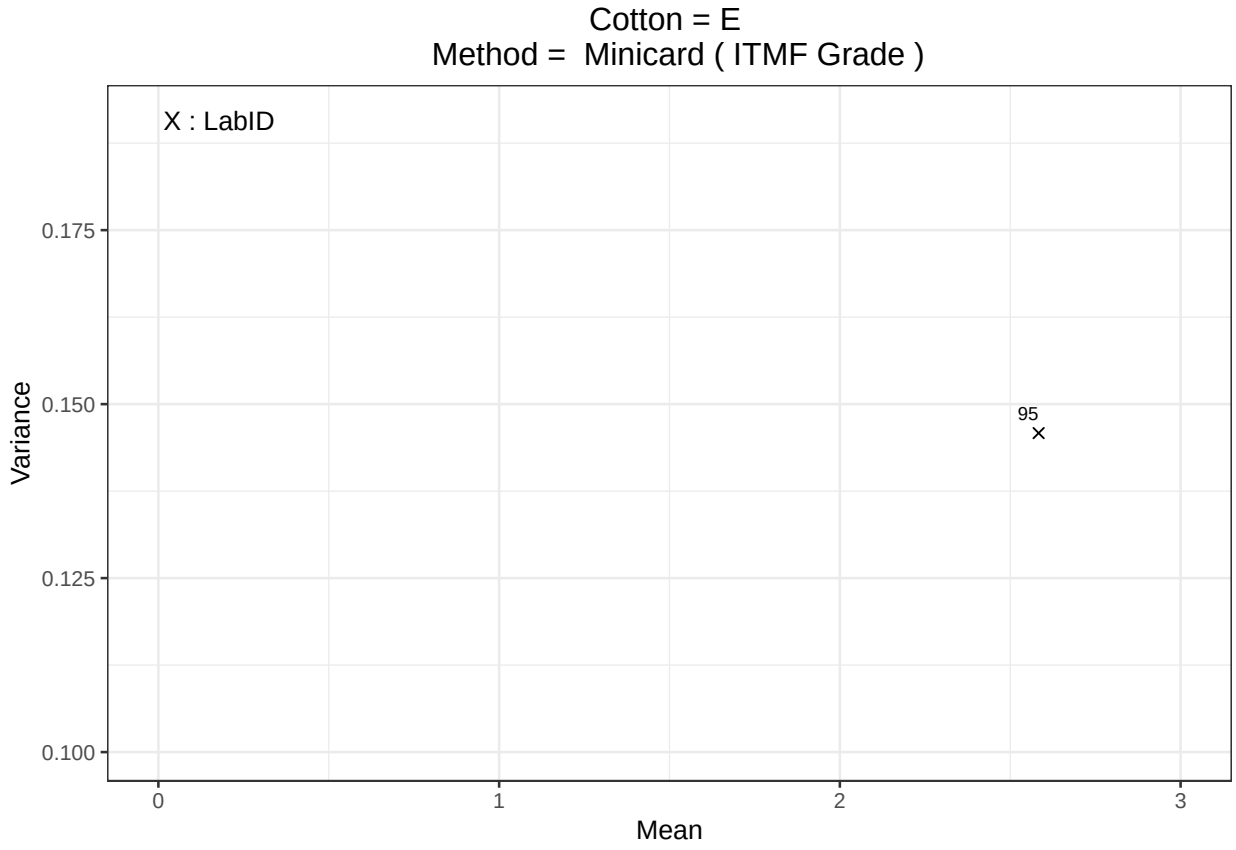
[1] "For Cotton = E and for method = Caramelization , 2 LabID (LabID being , 20, 30) cannot be shown on this chart as only one measurement was performed and, therefore, a variance cannot be calculated in this case."

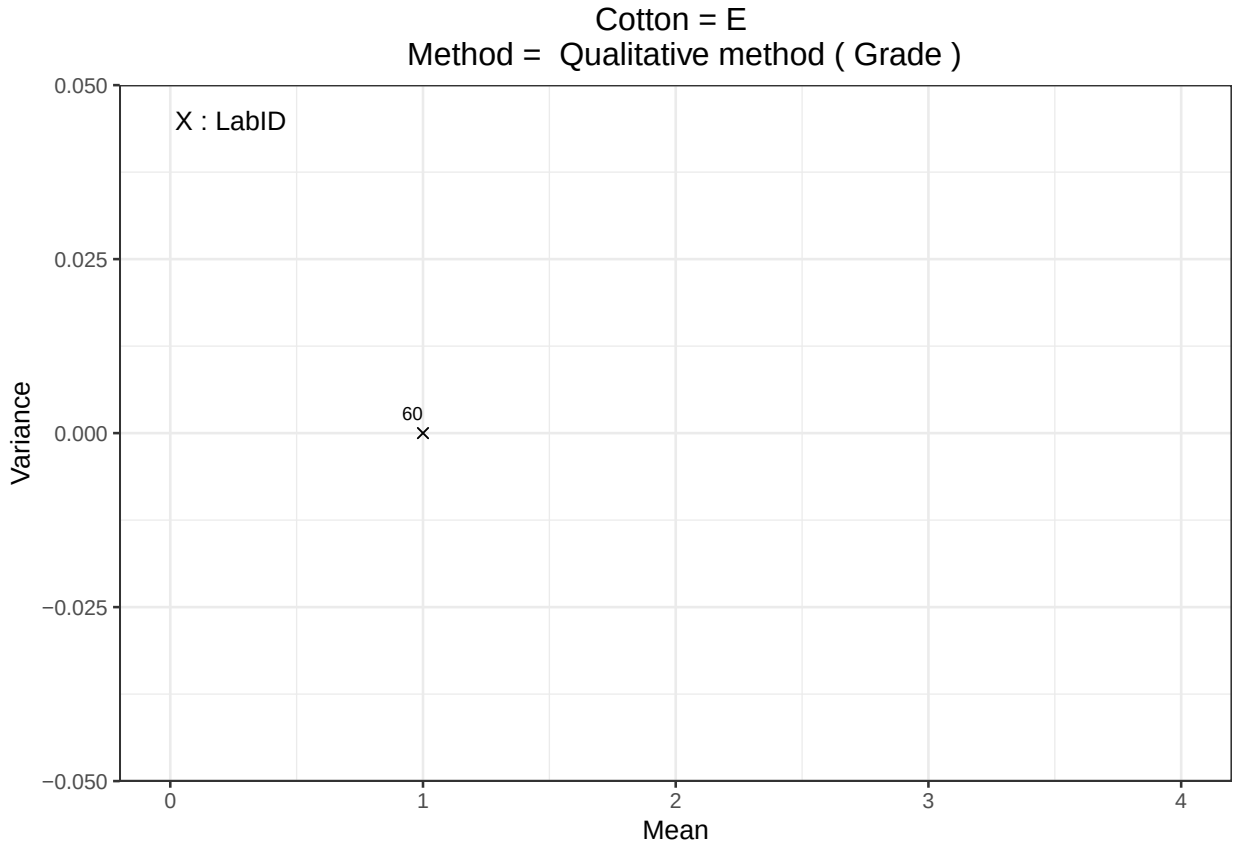

Cotton = E
Method = Contest−S (C/F Grade)
X : LabID
35
85
90
5000
4000
3000
2000
1000
Variance
0
200
400
600
Mean

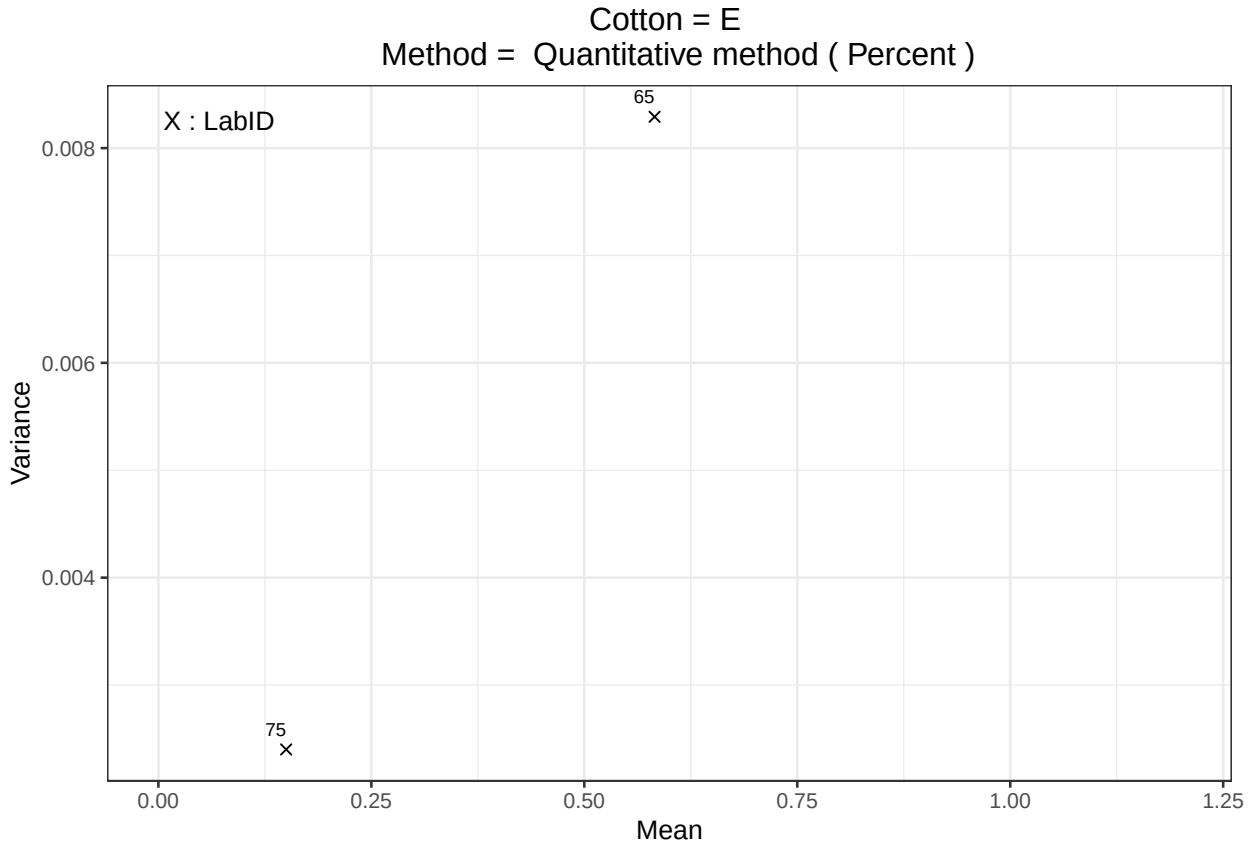

Cotton = E
Method = H2SD (Sticky points)
X : LabID
105
45
50
150
100
50
Variance
0
20
40
60
Mean

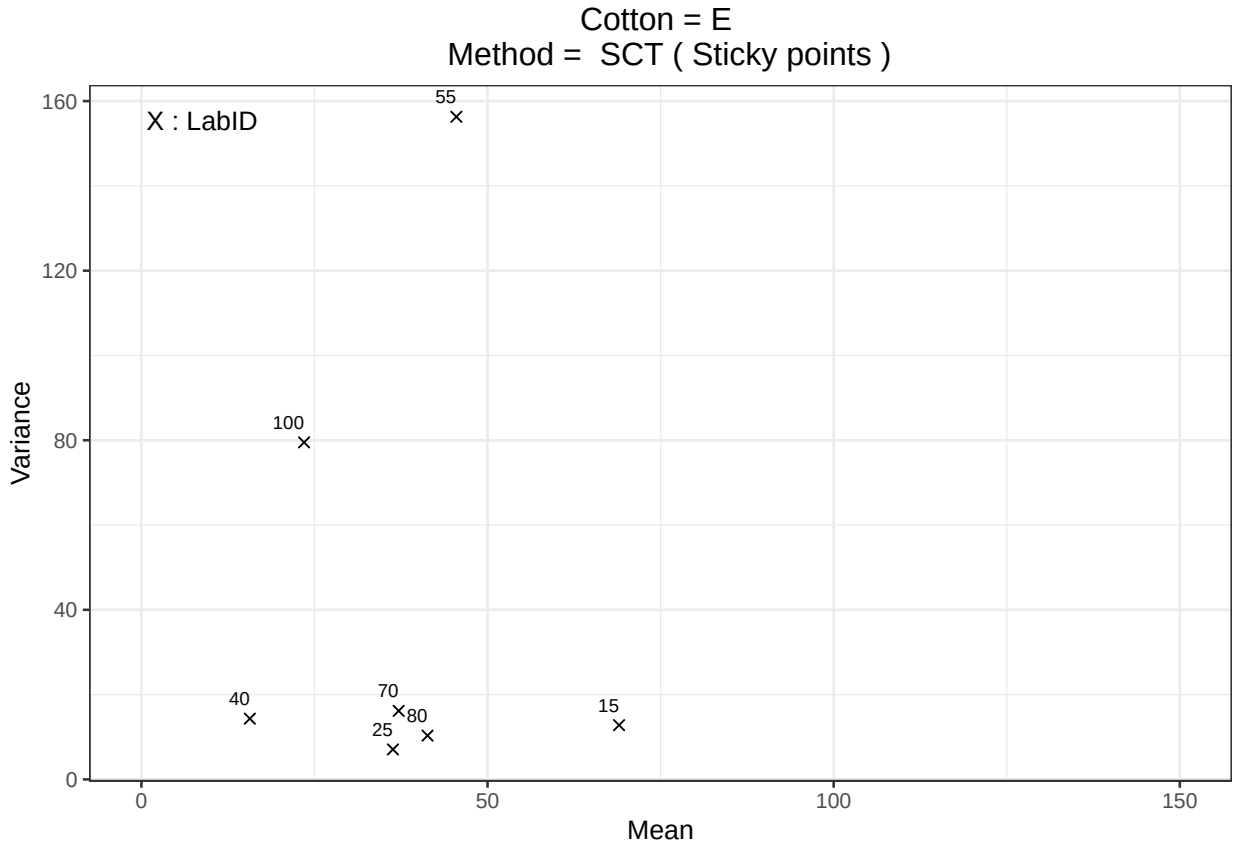

Cotton = E
Method = HSI−NIR (Sticky points)
X : LabID
7.80
7.78
7.76
7.74
7.72
Variance
110
0
50
100
150
Mean


Cotton = E
Method = KOTITI (KOTITI Grade)
X : LabID
0.050
0.025
0.000
−0.025
−0.050
Variance
5
0.0
2.5
5.0
7.5
Mean


Cotton = E
Method = Minicard (ITMF Grade)
X : LabID
0.175
0.150
0.125
0.100
Variance
95
0
1
2
3
Mean


Cotton = E
Method = Qualitative method (Grade)
X : LabID
60
Variance
Mean
0.050
0.025
0.000
−0.025
−0.050
0
1
2
3
4

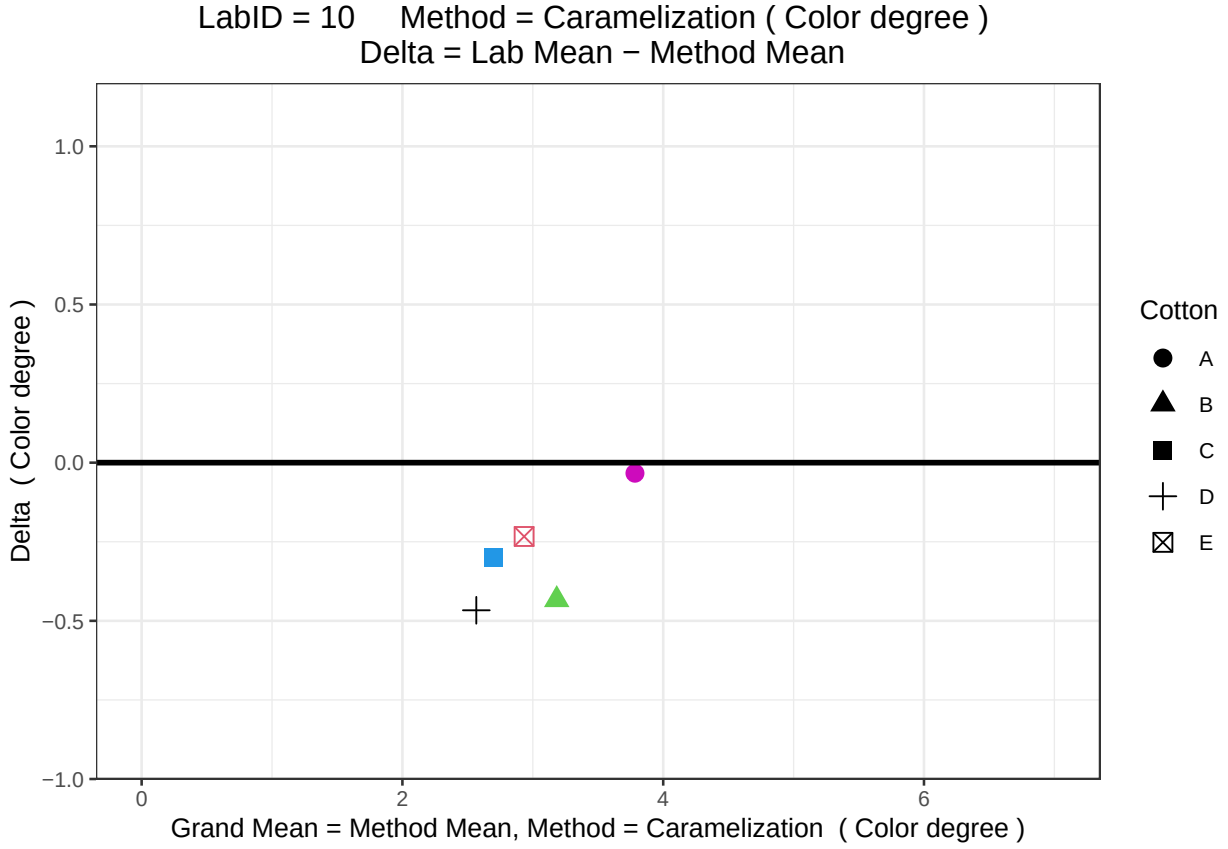

Cotton = E
Method = Quantitative method (Percent)
X : LabID
65
75
0.008
0.006
0.004
Variance
0.00
0.25
0.50
0.75
1.00
1.25
Mean


Cotton = E
Method = SCT (Sticky points)
X : LabID
Variance
Mean
160
120
80
40
0
0
50
100
150
55
100
40
70
80
25
15

CSITC type charts: distance Delta of Lab readings to the Grand Mean by Method and by LabID [6]

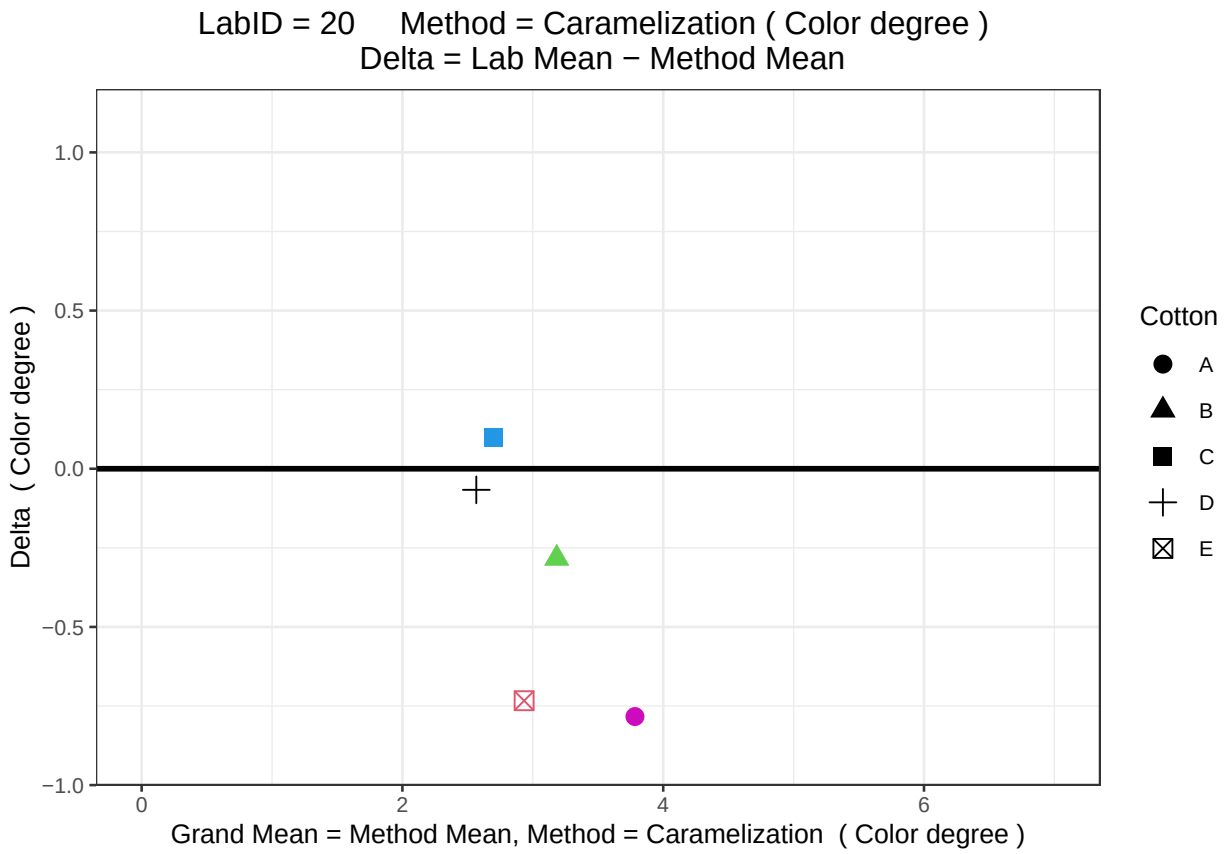
This type of chart is devoted to displaying the ability of any Method and any LabID to not deviate from the observed GrandMean of any given characteristic whatever the measured levels of the participating cottons, and then covering the range of stickiness of the participating cottons in this case. If only one LabId is using a given Method, then all Delta points (one point per participating cotton) will be positionned at Delta = 0 (Y axis) and at the GrandMean values of the cottons (X axis). If two labs are using a given Method, then their resepctive Delta points will be positionned in symetry of the X axis at the respective Delta values (Y axis) and at the GrandMean values of the cottons (on the X axis).

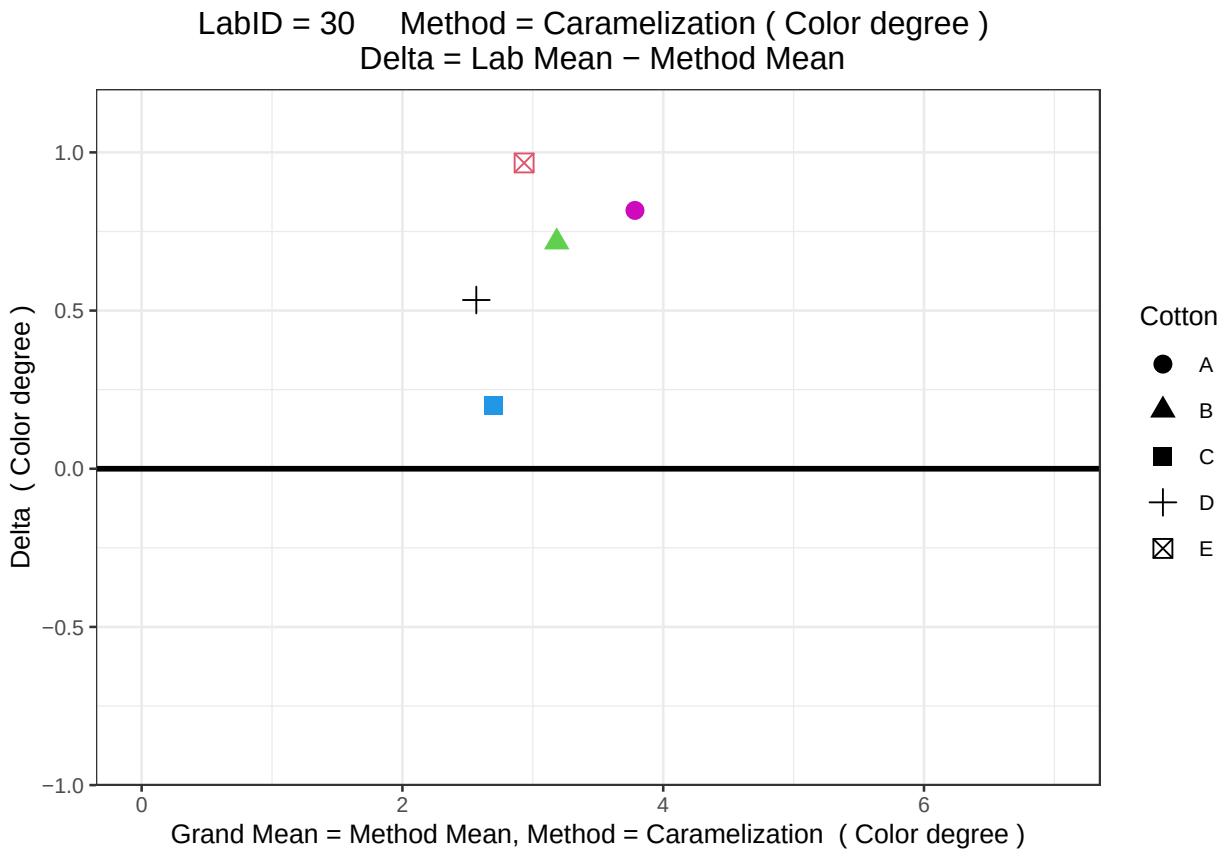
CSITC type chart for Method Caramelization



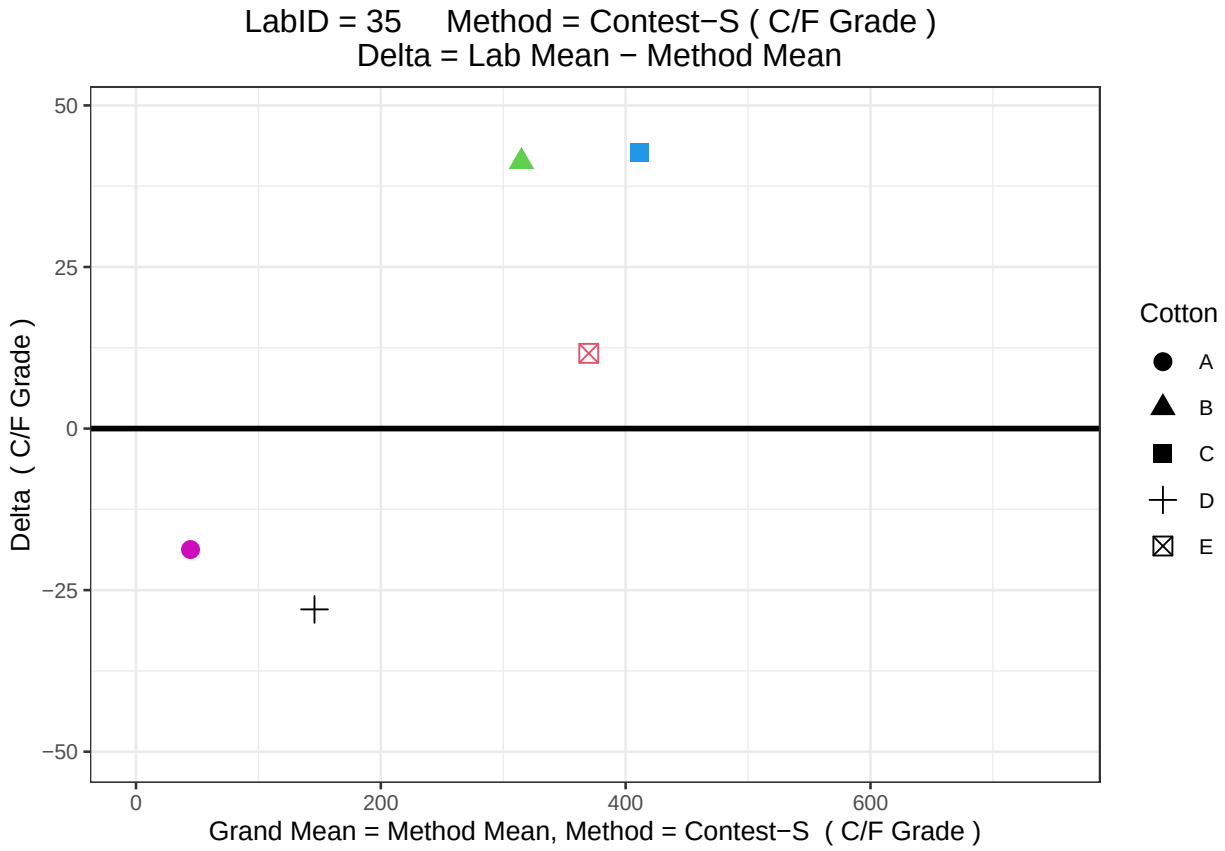
[6] Footnote

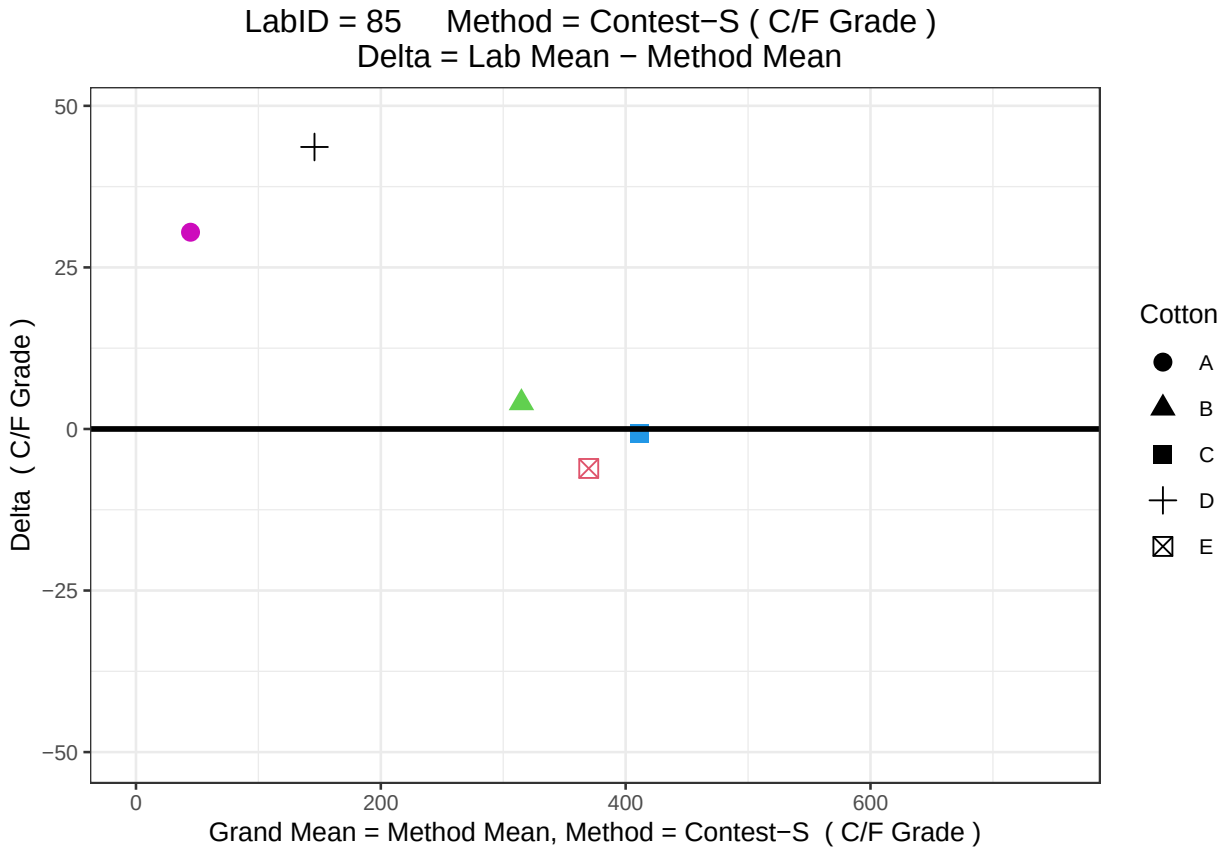
* GMean = Grand Mean of all laboratory means, calculated by Method.
* Chart abscissa axis is given in the original individual readings scale.

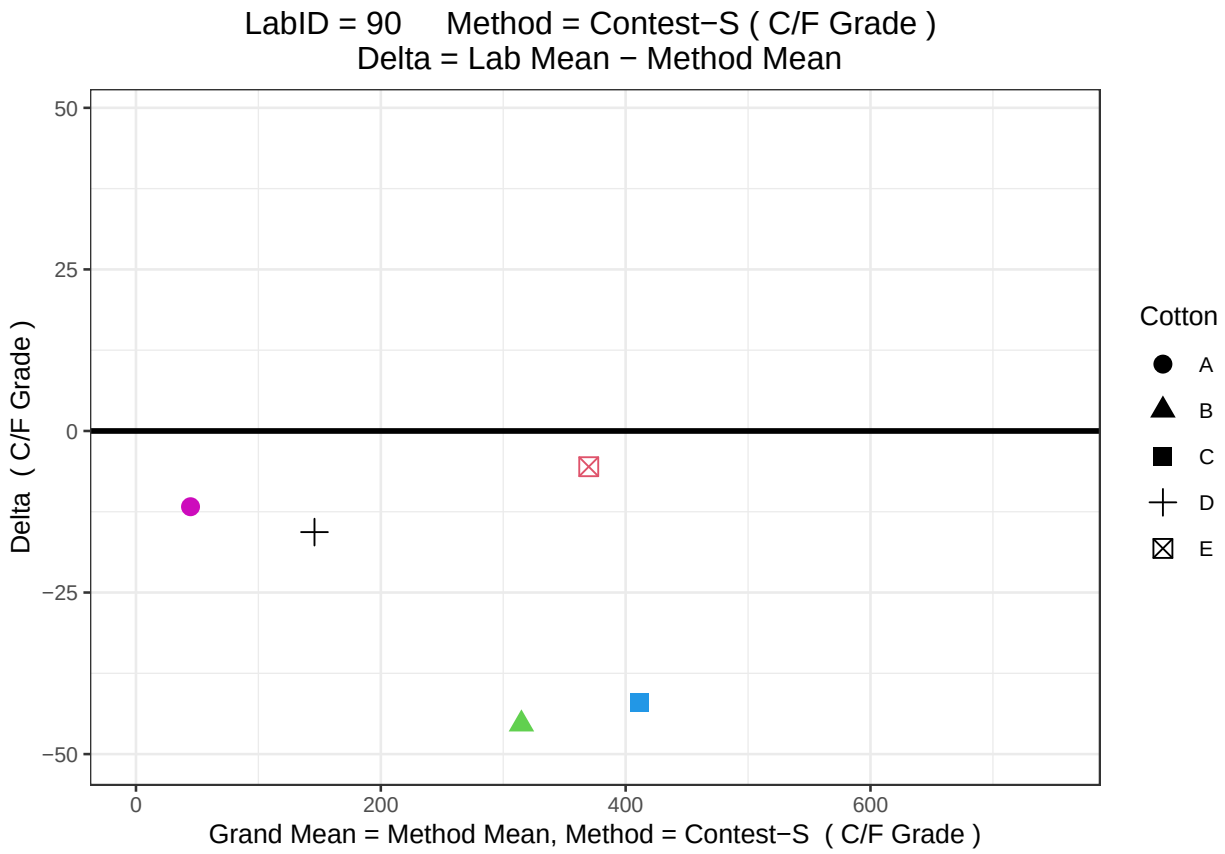

LabID = 20 Method = Caramelization (Color degree)
Delta = Lab Mean − Method Mean
Delta (Color degree)
1.0
0.5
0.0
−0.5
−1.0
0
2
4
6
Grand Mean = Method Mean, Method = Caramelization (Color degree)
Cotton
A
B
C
D
E


LabID = 30 Method = Caramelization (Color degree)
Delta = Lab Mean − Method Mean
Delta (Color degree)
1.0
0.5
0.0
−0.5
−1.0
0
2
4
6
Grand Mean = Method Mean, Method = Caramelization (Color degree)
Cotton
A
B
C
D
E

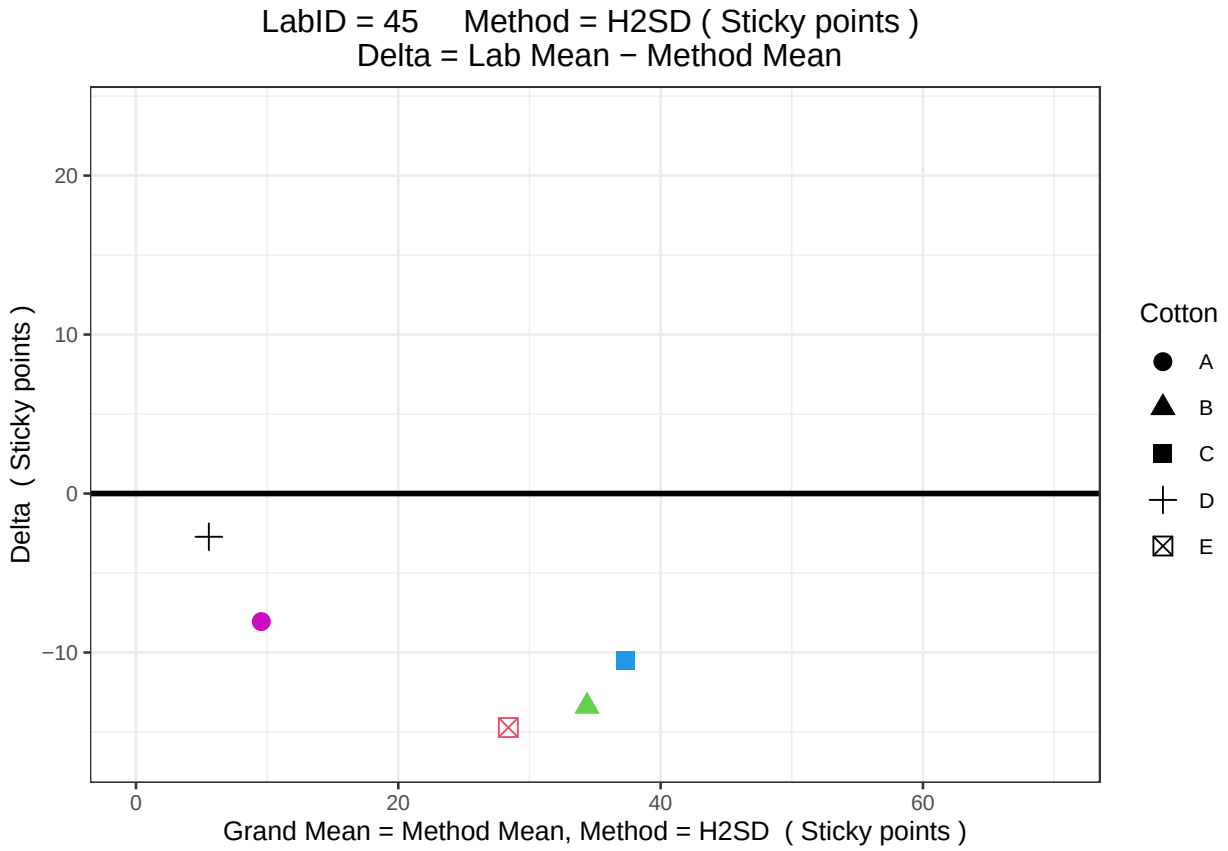
CSITC type chart for Method Contest-S

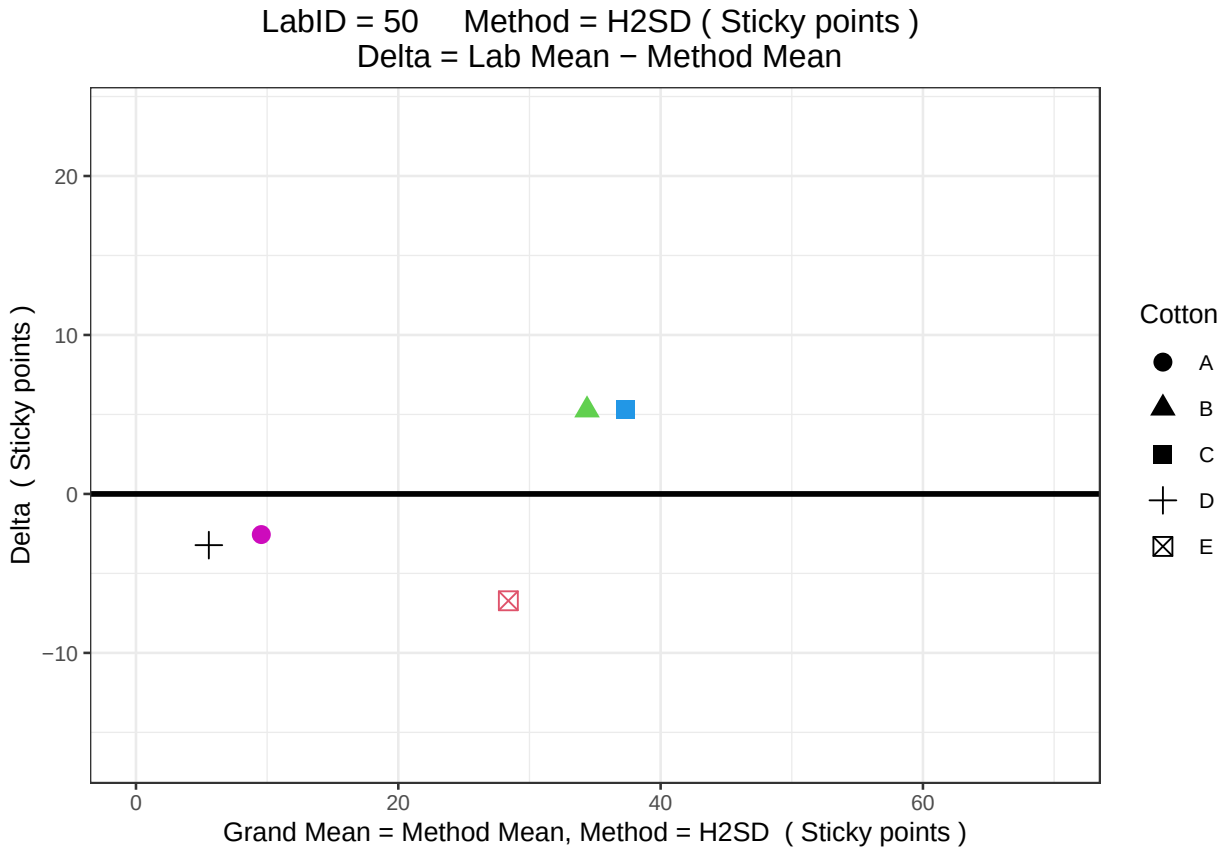


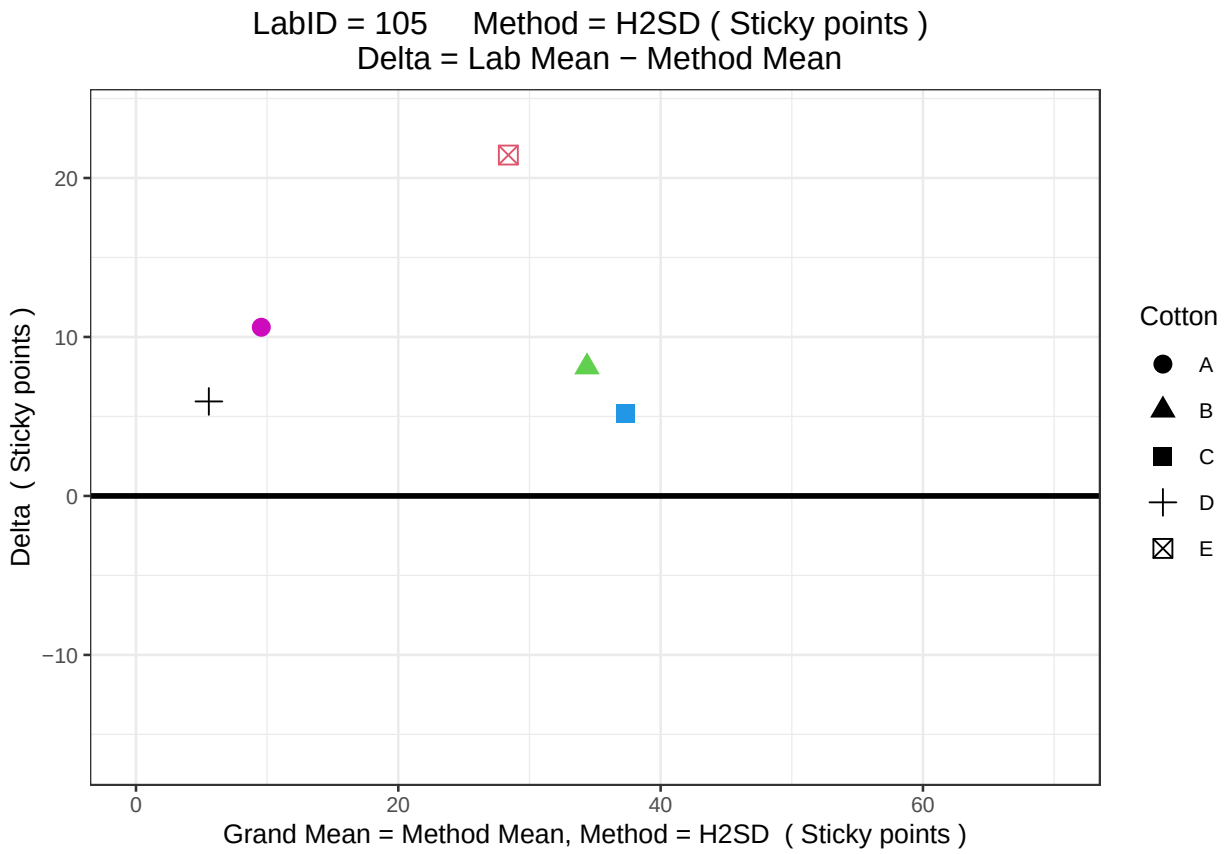

LabID = 85 Method = Contest−S (C/F Grade)
Delta = Lab Mean − Method Mean
50
25
0
−25
−50
Delta (C/F Grade)
0
200
400
600
Grand Mean = Method Mean, Method = Contest−S (C/F Grade)
Cotton
A
B
C
D
E


LabID = 90 Method = Contest−S (C/F Grade)
Delta = Lab Mean − Method Mean
Delta (C/F Grade)
50
25
0
−25
−50
0
200
400
600
Grand Mean = Method Mean, Method = Contest−S (C/F Grade)
Cotton
A
B
C
D
E

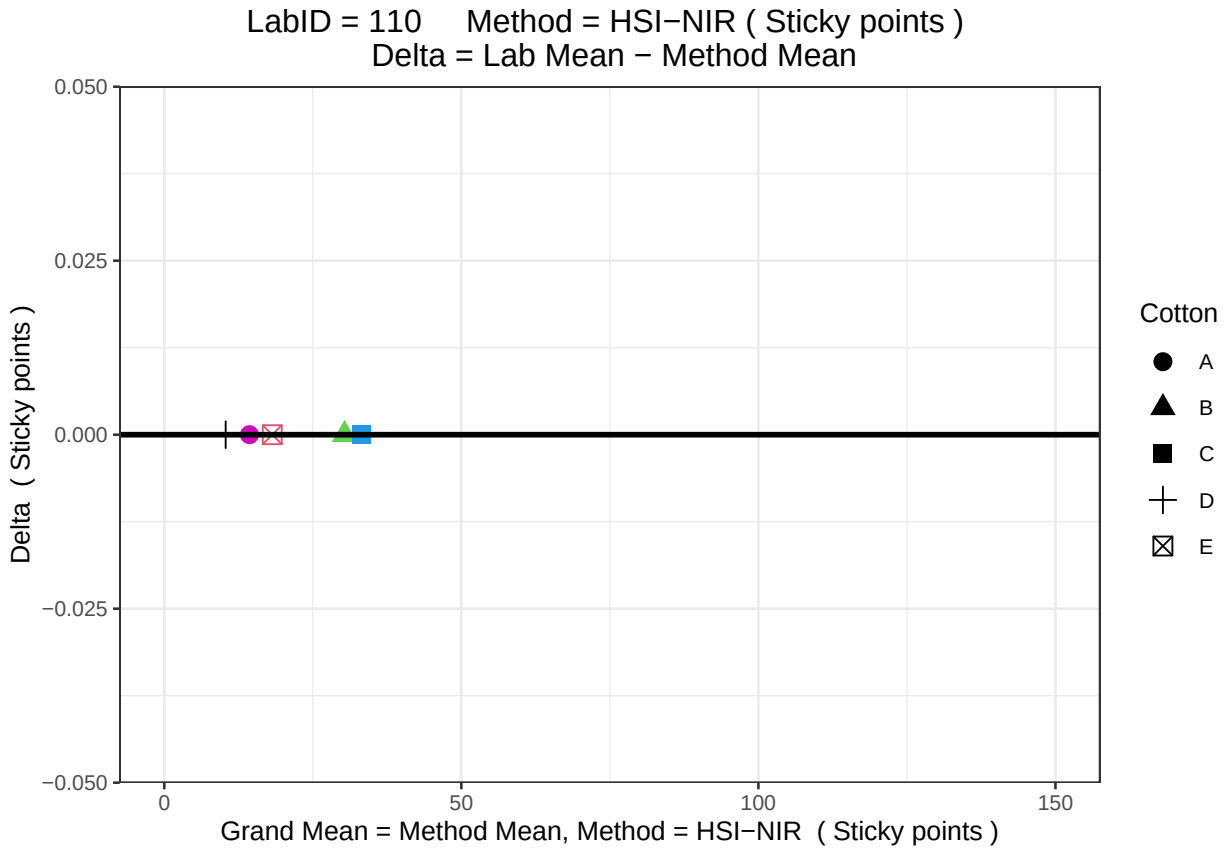
CSITC type chart for Method H2SD



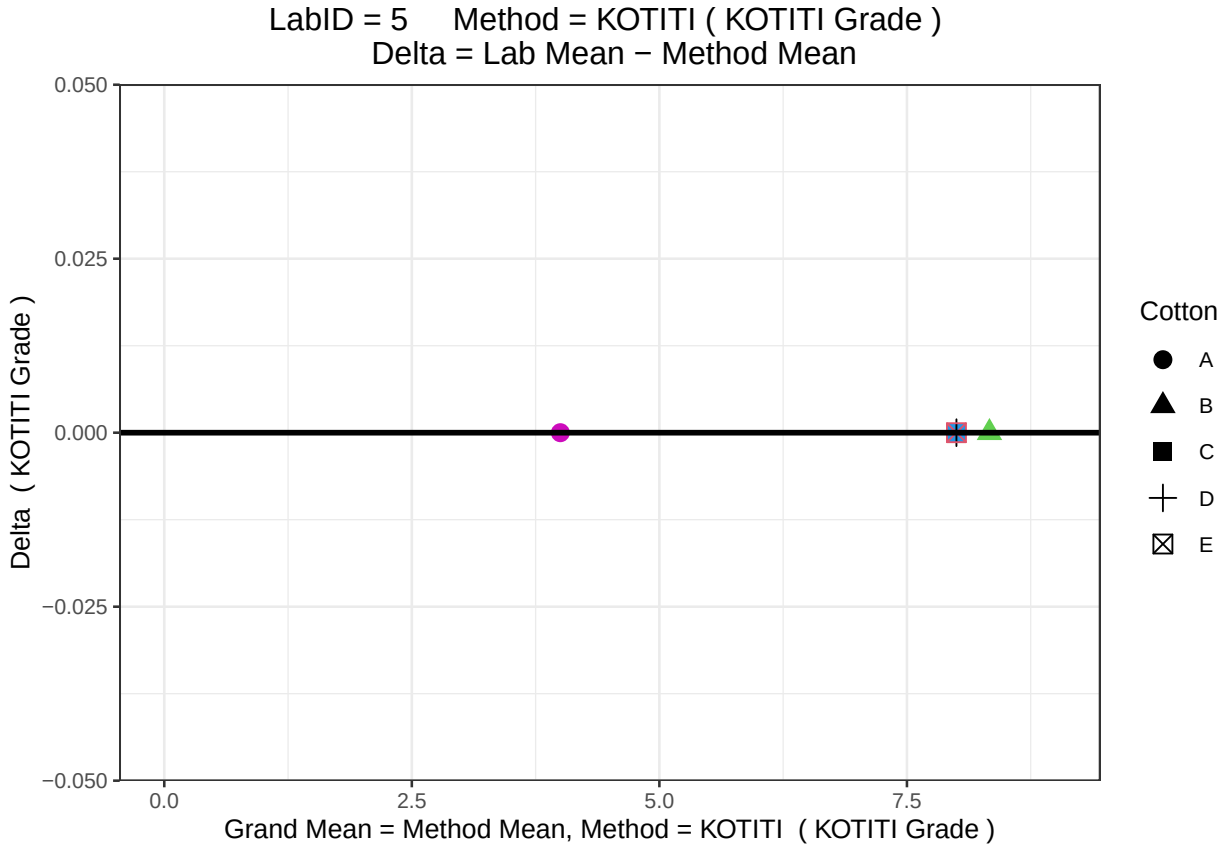

LabID = 50 Method = H2SD (Sticky points)
Delta = Lab Mean − Method Mean
Delta (Sticky points)
20
10
0
−10
0
20
40
60
Grand Mean = Method Mean, Method = H2SD (Sticky points)
Cotton
A
B
C
D
E


LabID = 105 Method = H2SD (Sticky points)
Delta = Lab Mean − Method Mean
Delta (Sticky points)
20
10
0
−10
0
20
40
60
Grand Mean = Method Mean, Method = H2SD (Sticky points)
Cotton
A
B
C
D
E

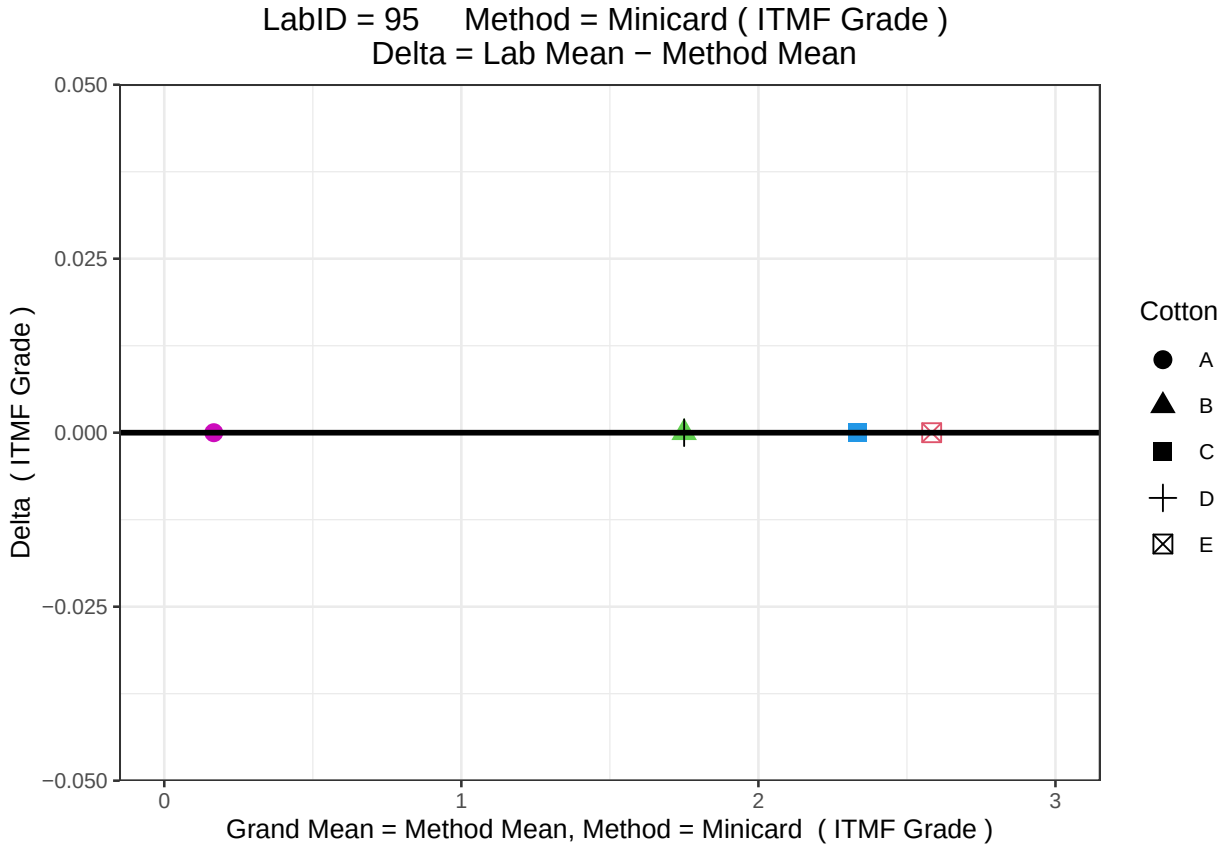
CSITC type chart for Method HSI-NIR



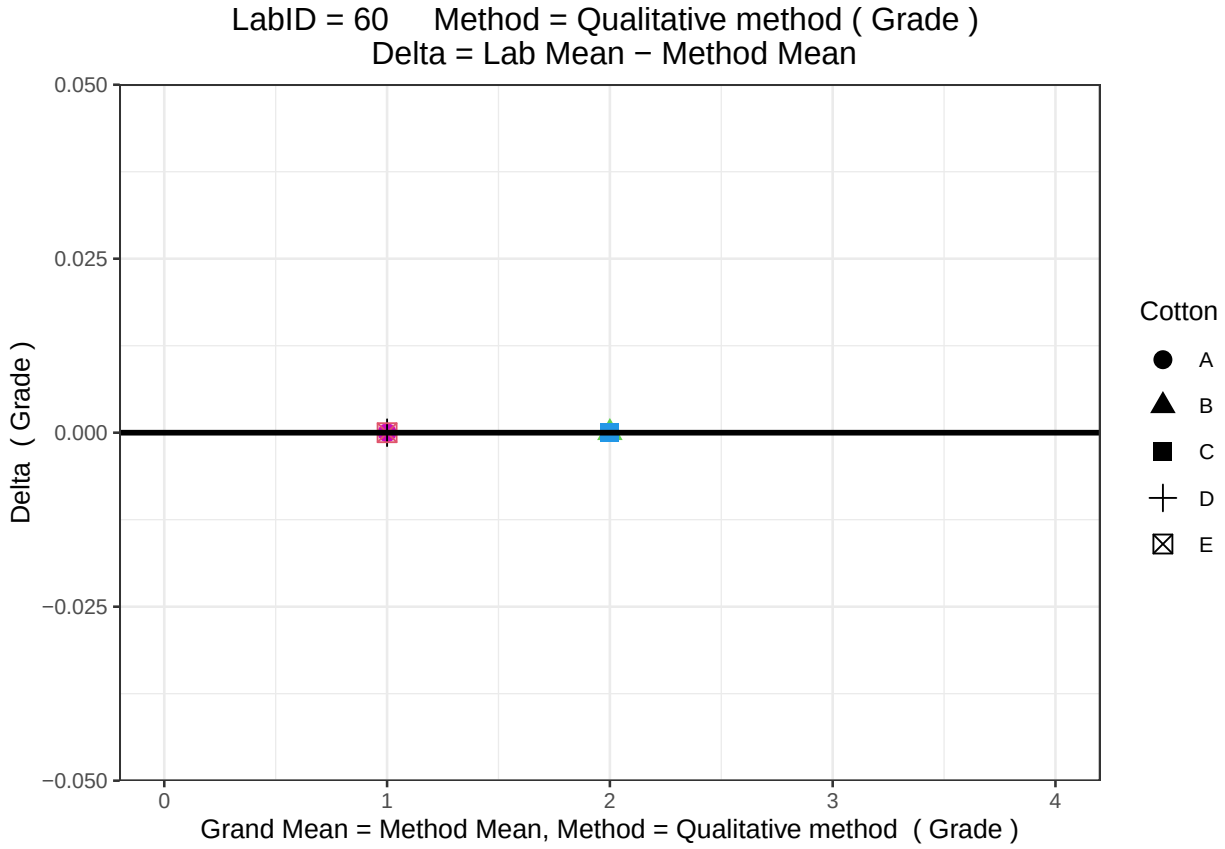
CSITC type chart for Method KOTITI



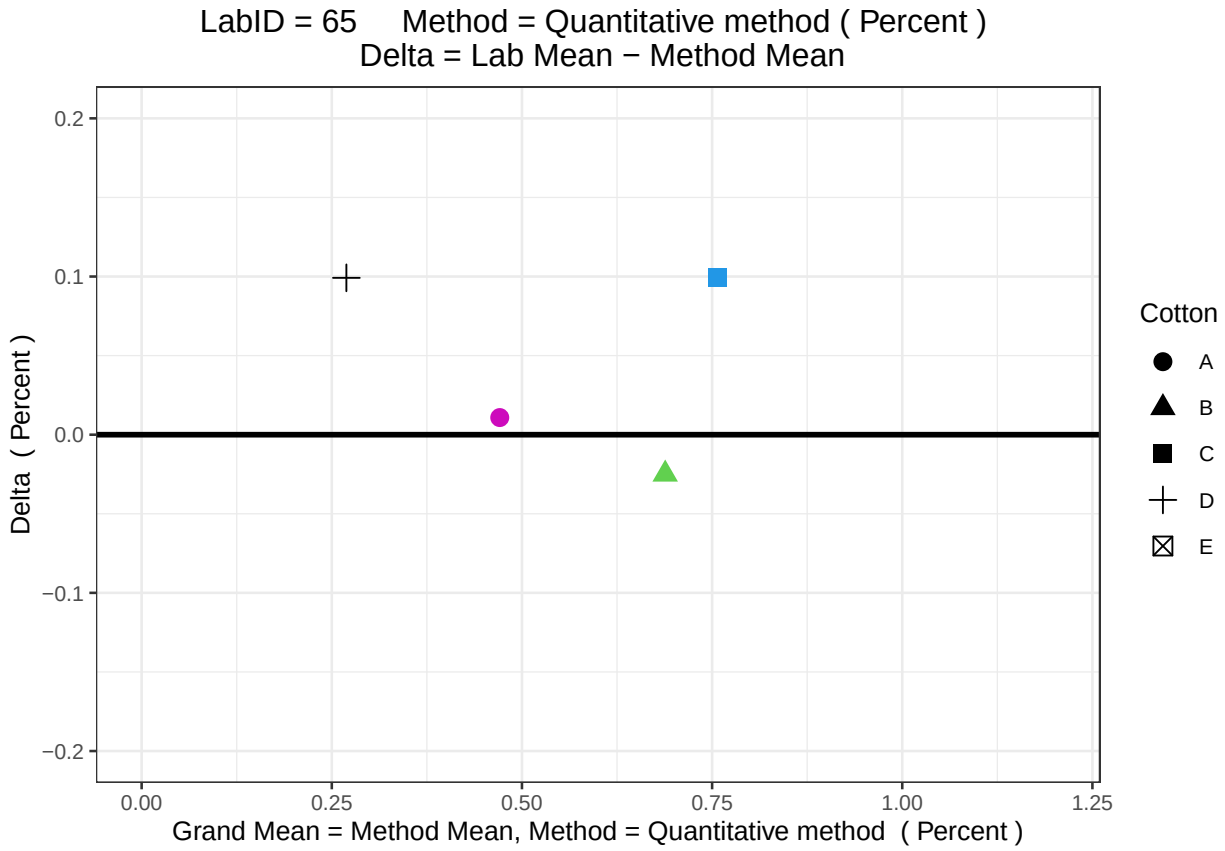
CSITC type chart for Method Minicard

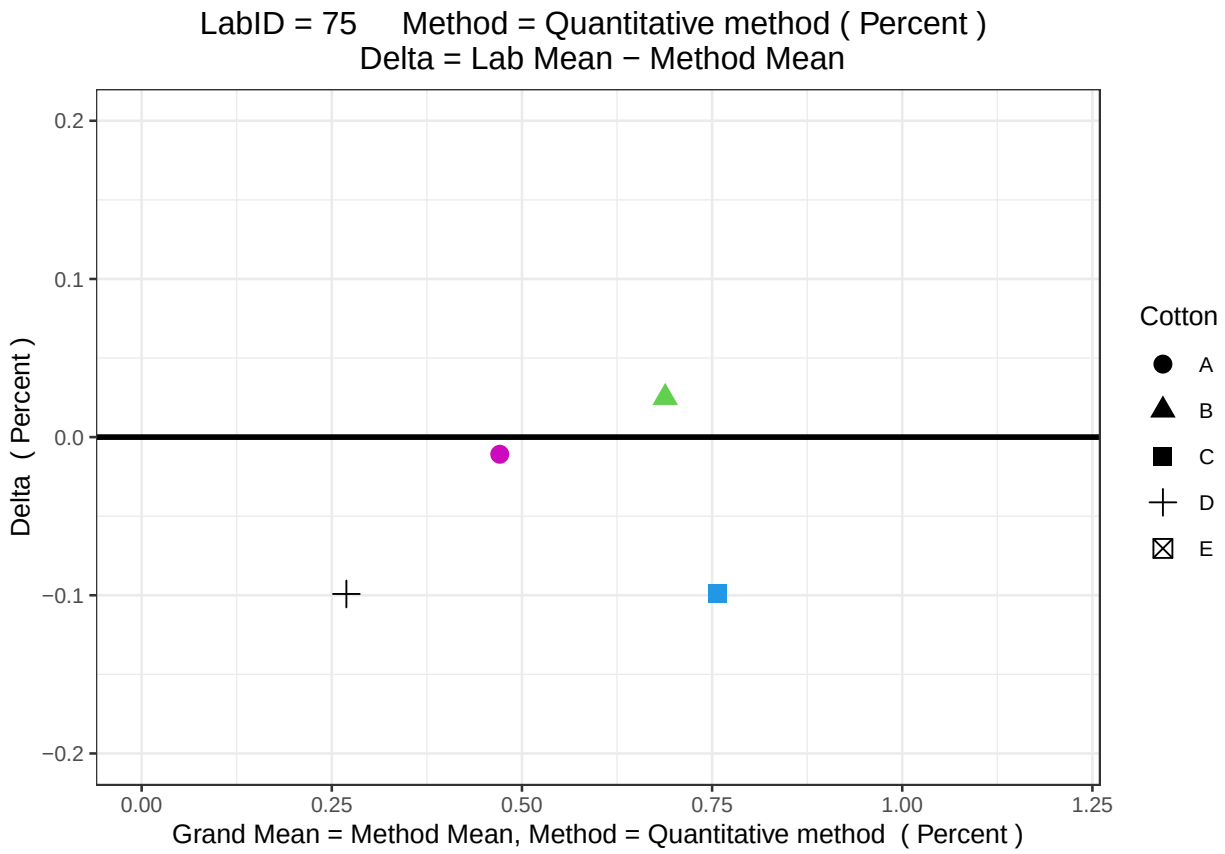


CSITC type chart for Method Qualitative method

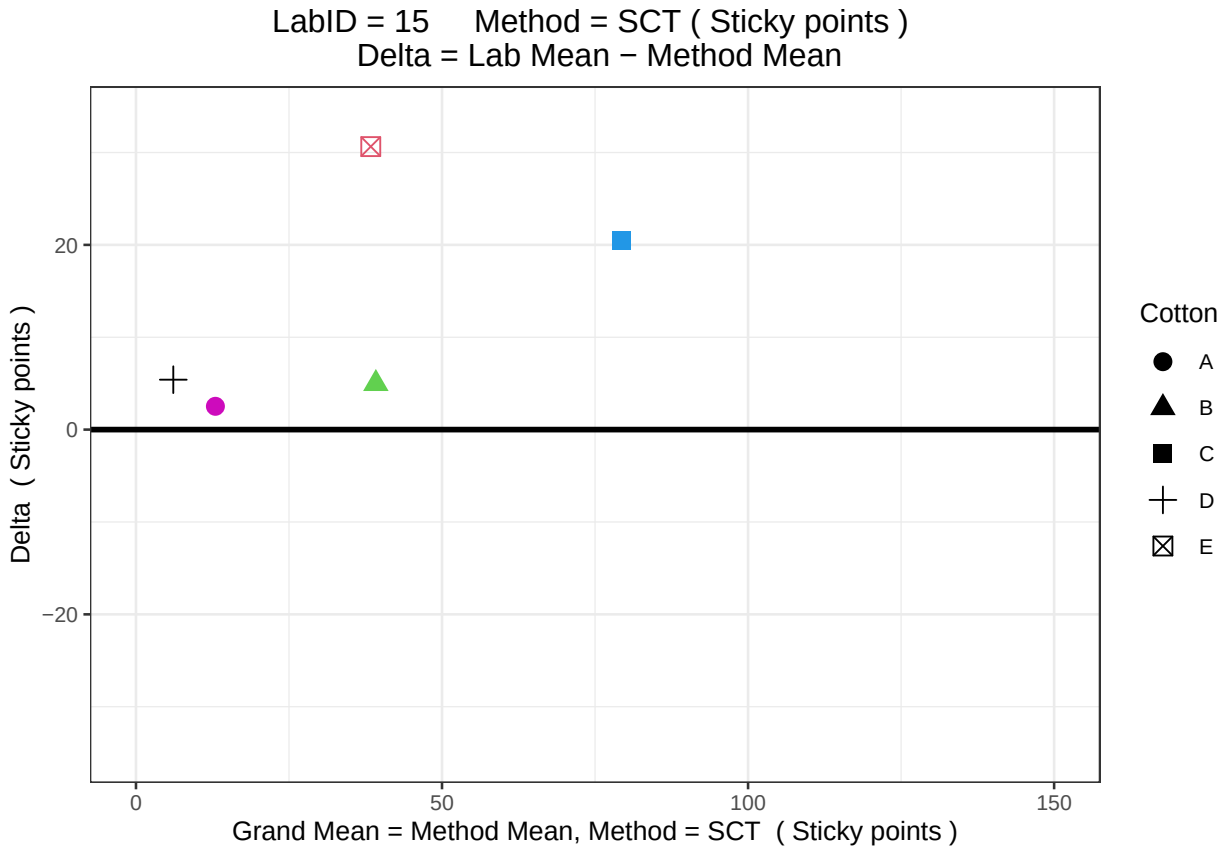


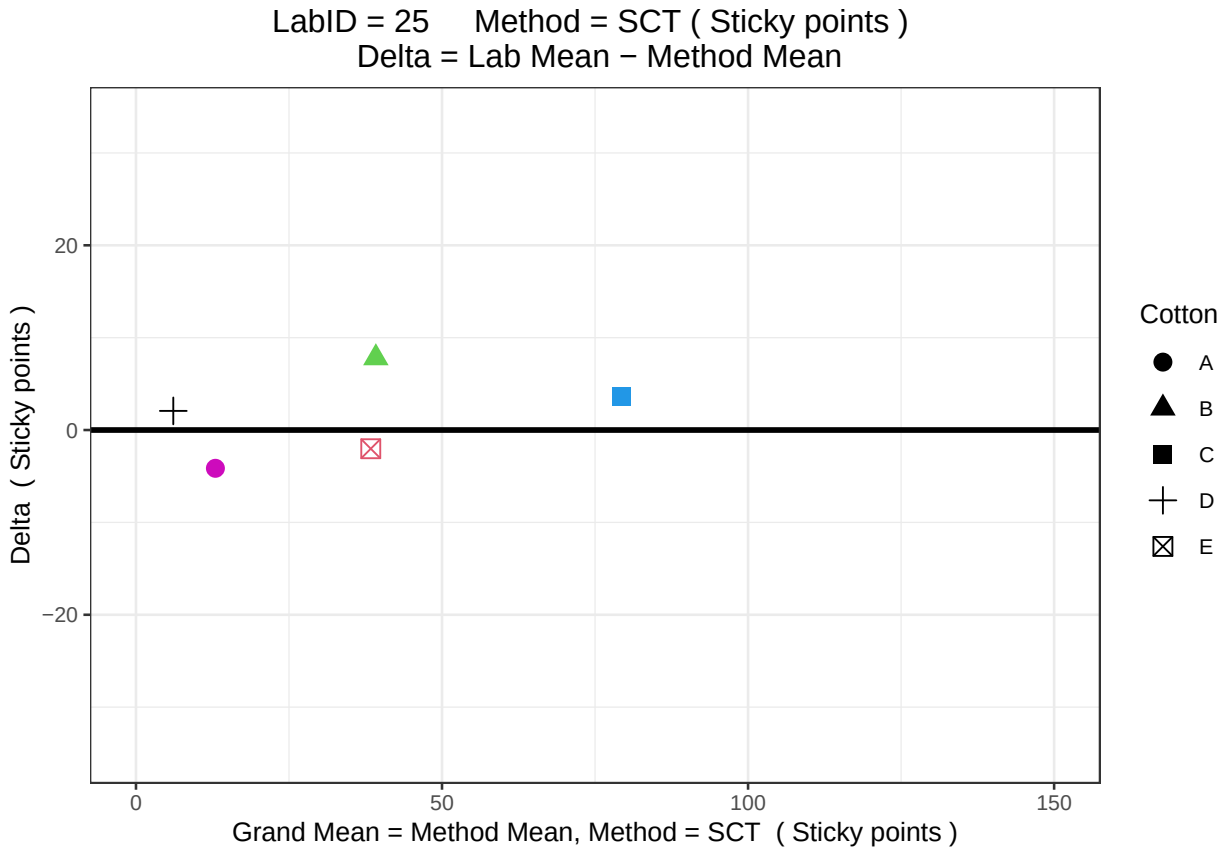
CSITC type chart for Method Quantitative method

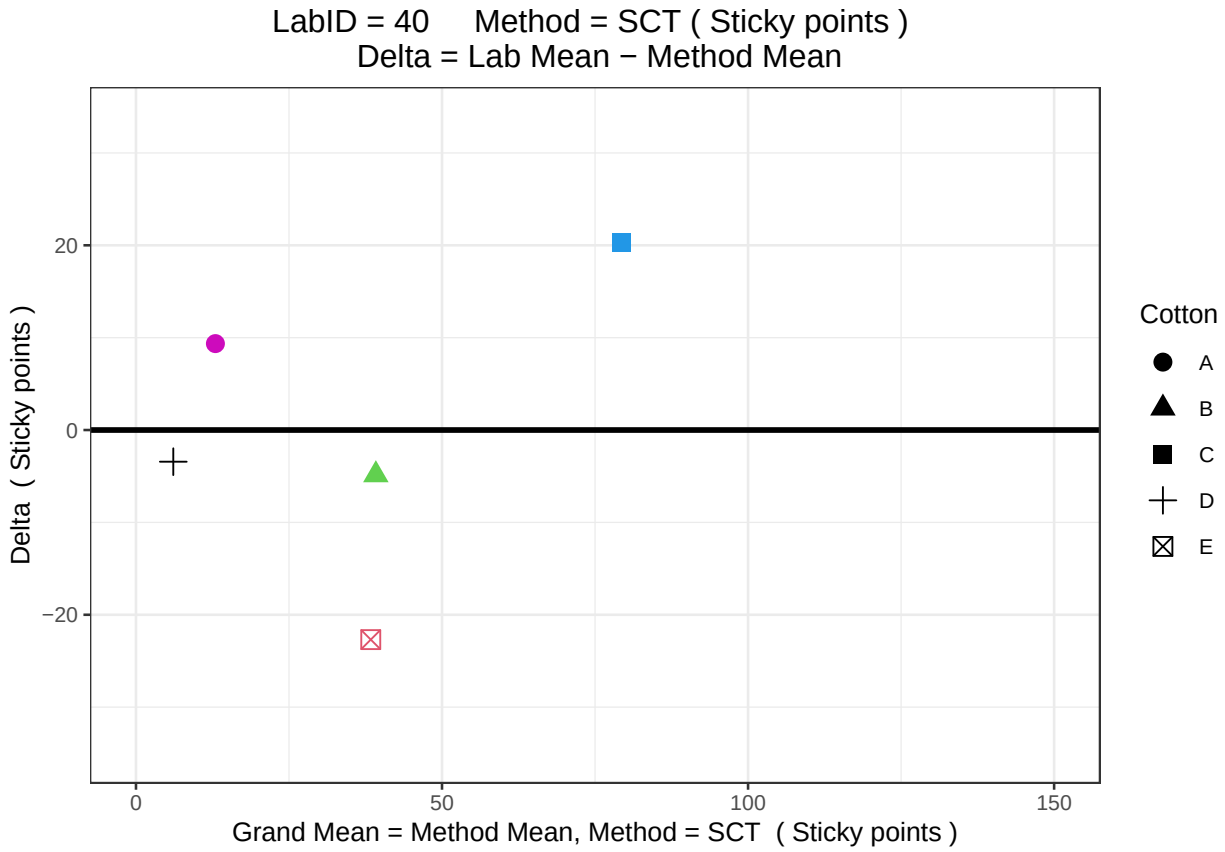


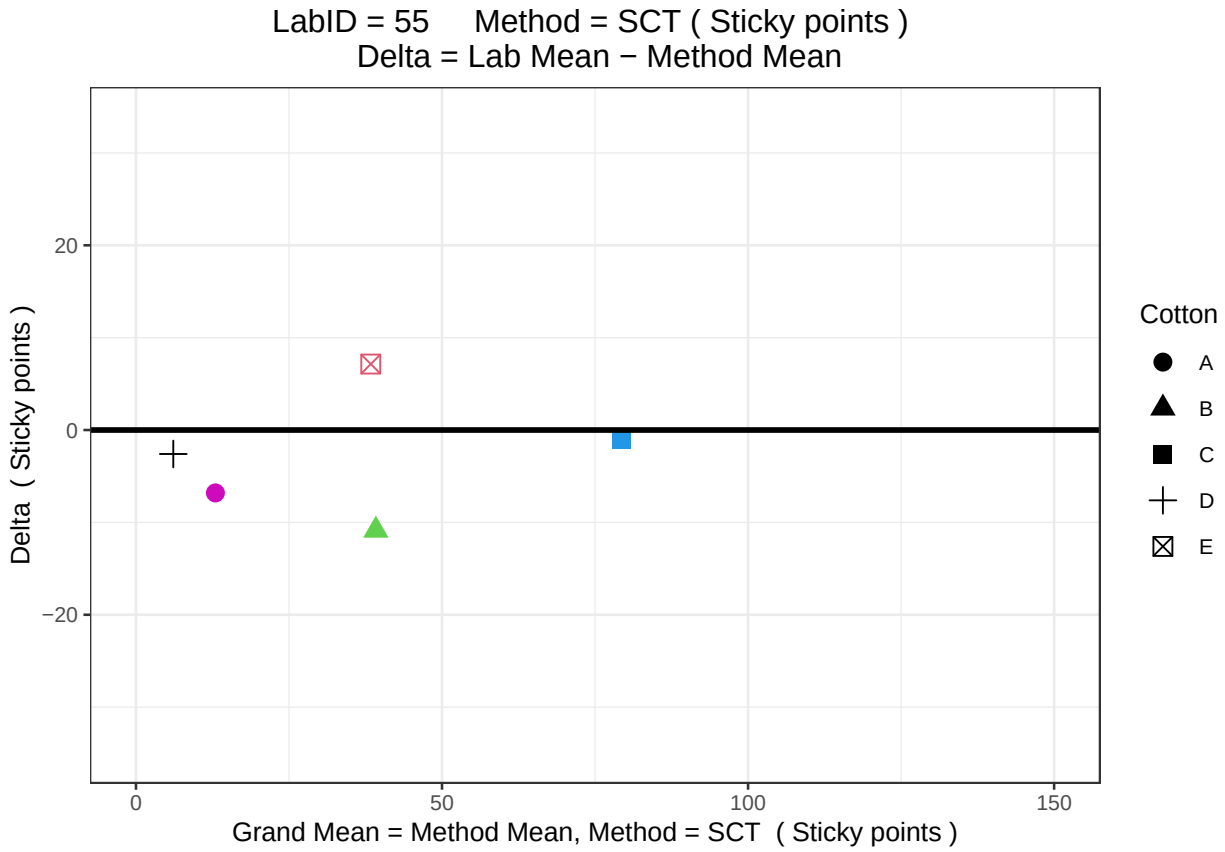

LabID = 75 Method = Quantitative method (Percent)
Delta = Lab Mean − Method Mean
Delta (Percent)
0.2
0.1
0.0
−0.1
−0.2
0.00
0.25
0.50
0.75
1.00
1.25
Grand Mean = Method Mean, Method = Quantitative method (Percent)
Cotton
A
B
C
D
E

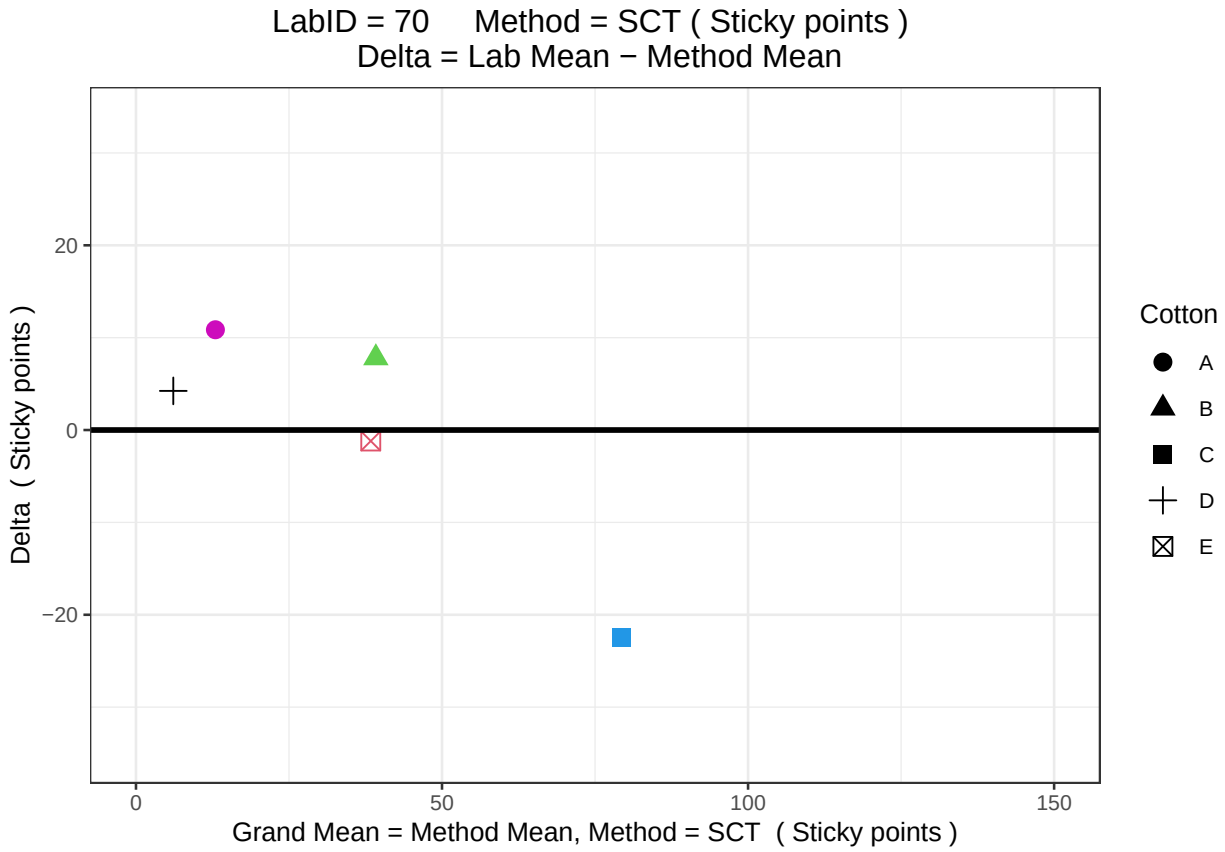
CSITC type chart for Method SCT

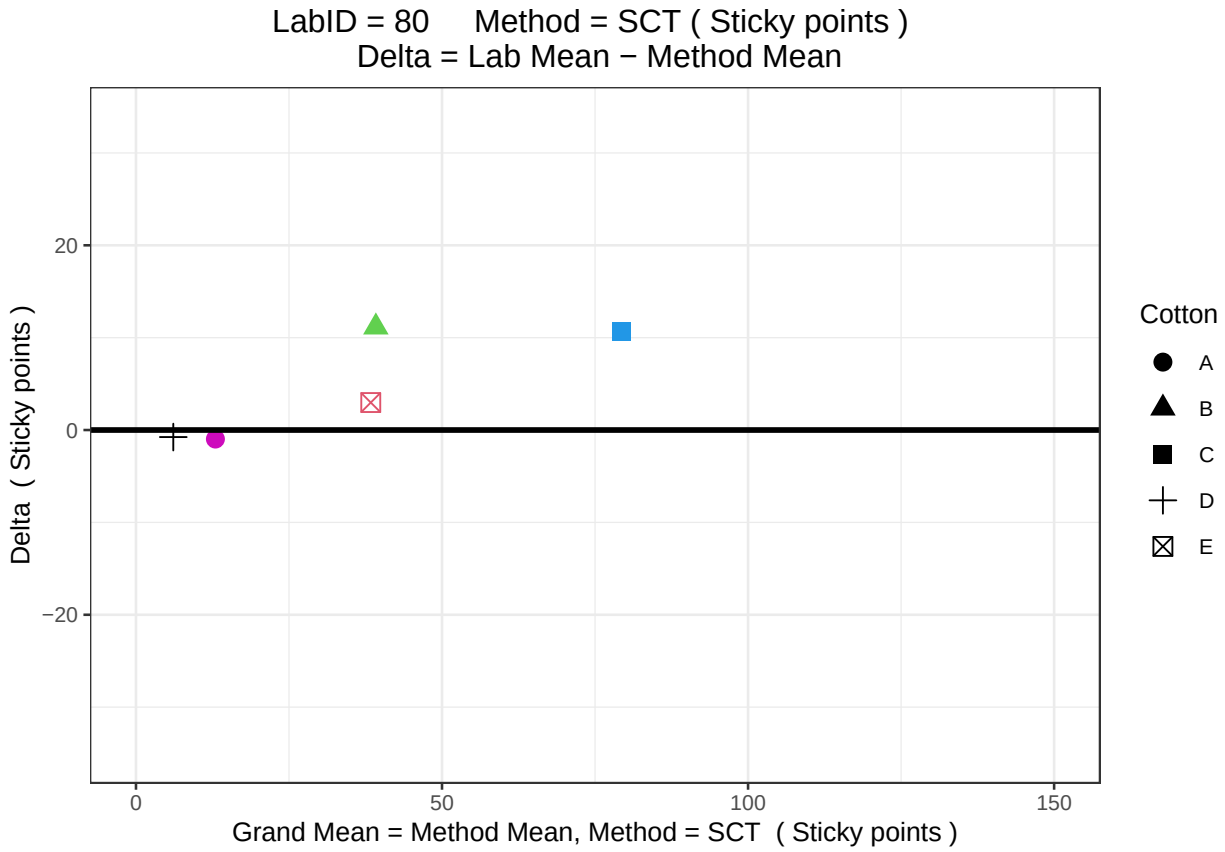


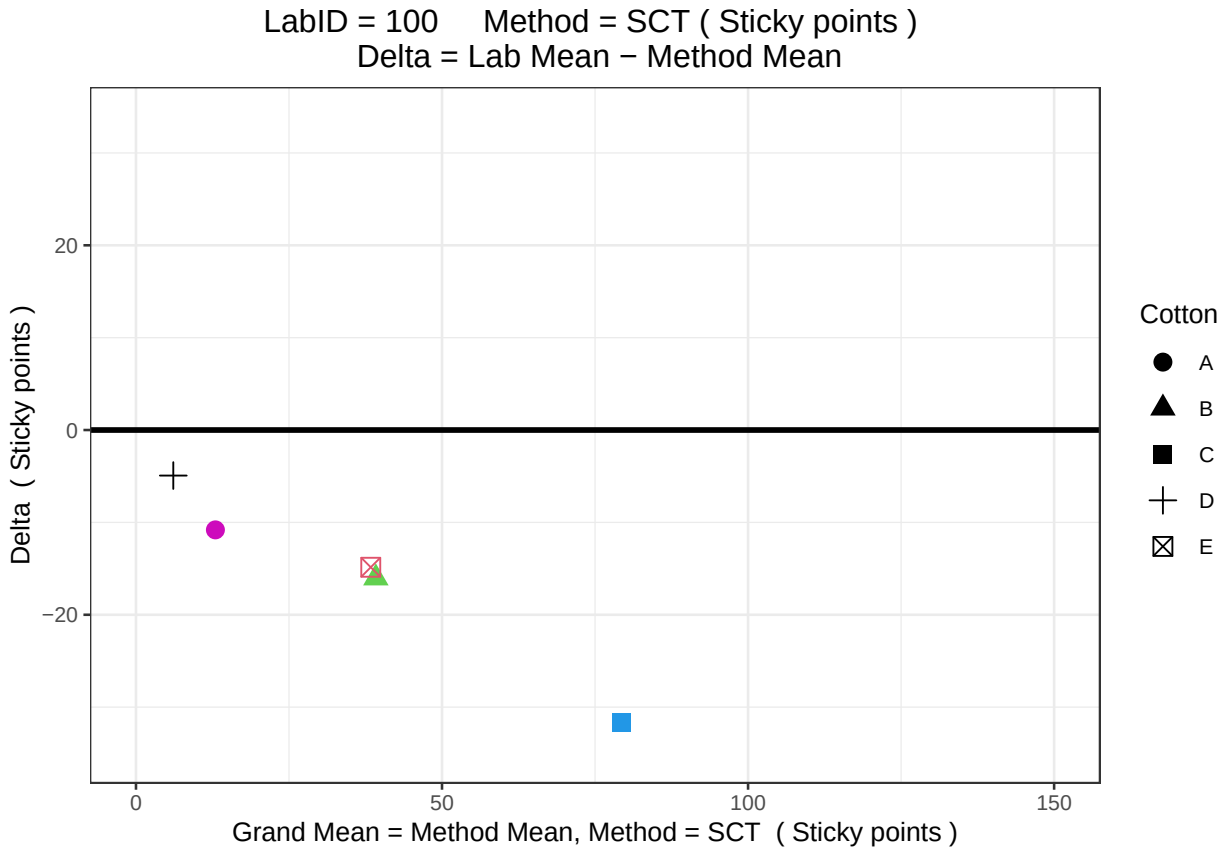

LabID = 25 Method = SCT (Sticky points)
Delta = Lab Mean − Method Mean
Delta (Sticky points)
20
0
−20
0
50
100
150
Grand Mean = Method Mean, Method = SCT (Sticky points)
Cotton
A
B
C
D
E


LabID = 40 Method = SCT (Sticky points)
Delta = Lab Mean − Method Mean
Delta (Sticky points)
20
0
−20
0
50
100
150
Grand Mean = Method Mean, Method = SCT (Sticky points)
Cotton
A
B
C
D
E


LabID = 55 Method = SCT (Sticky points)
Delta = Lab Mean − Method Mean
Delta (Sticky points)
20
0
−20
0
50
100
150
Grand Mean = Method Mean, Method = SCT (Sticky points)
Cotton
A
B
C
D
E


LabID = 70 Method = SCT (Sticky points)
Delta = Lab Mean − Method Mean
Delta (Sticky points)
20
0
−20
0
50
100
150
Grand Mean = Method Mean, Method = SCT (Sticky points)
Cotton
A
B
C
D
E


LabID = 80 Method = SCT (Sticky points)
Delta = Lab Mean − Method Mean
Delta (Sticky points)
20
0
−20
0
50
100
150
Grand Mean = Method Mean, Method = SCT (Sticky points)
Cotton
A
B
C
D
E


LabID = 100 Method = SCT (Sticky points)
Delta = Lab Mean − Method Mean
Delta (Sticky points)
20
0
−20
0
50
100
150
Grand Mean = Method Mean, Method = SCT (Sticky points)
Cotton
A
B
C
D
E

CommonScale [7]

Principle

In ITMF-ICCTM meeting organized in March 2018 in Bremen, it was envisaged to compare results from various stickiness methods to check how close are the gained results. A proposal using a pro-rata approach was made as one way to achieve this comparison. The following table gives the numeric values to which each and all results from this round-test were calculated whith the following formula: $CommonScale = \frac{LabID\ \ reading\ *\ 100}{MaxEver\ \ for\ \ this\ \ method}$, with MaxEver being the maximum value that any given method could read for the most sticky cotton ever. This will continue as long as necessary.

During this ITMF-ICCTM meeting in March 2018, it was also mentioned that MaxEver may not be the best way to base the provided calculations for COmmonScale. We then expect Participating Laboratories to propose an other calculation method(s), which then would be added to this report in the future.

Method	MaxEver	Unit
Caramelization	7.0	Color degree
Contest-S	750.0	C/F Grade
H2SD	70.0	Sticky points
HSI-NIR	150.0	Sticky points
KOTITI	9.0	KOTITI Grade
Minicard	3.0	ITMF Grade
Qualitative method	4.0	Grade
Quantitative method	1.2	Percent
SCT	150.0	Sticky points

For instance,

- a reading of 2 at the minicard, with a MaxEver set at 3, will convert into a CommonScale reading of: $67 = \frac{2\ *\ 100}{3}$.
- a reading of 63 at the SCT, with a MaxEver set at 150, will convert into a CommonScale reading of: $42 = \frac{63\ *\ 100}{150}$.
- *etc.*

[7] Footnote
* In the following charts, ML stands for the code Method x LabID.
* In the following charts, LM stands for the code LabID x Method.
* NA excluded
* Black dashed line = Method MeanInterLab per cotton and per Method.
* Red + = Laboratory mean for the given method and for the given cotton.
* Black x = Laboratory or CommonScale reading or individual reading for the given method and for the given cotton.

Limitations of the CommonScale approach

This approach has potential limitations:

- The resolution of CommonScale results is not equivalent for methods having a discrete scale, especially when the number of levels is low (for instance, levels for minicard stickiness grading is limited to 4 [0, 1, 2 and 3]) letting the corresponding CommonScale only limited to 0, 33, 67 and 100 results. In the same time, other methods having counts expressed in sticky points on extended scales for instance have lot more possibilities, as well as method being able to measure according to a continuous scale.

- It **only is safe to compare methods that are measuring the same single phenomenon, stickiness, or phenomenons that are related to stickiness.** At this point in time, it is not given that all present methods are measuring 'stickiness' or criterion that are related to stickiness.

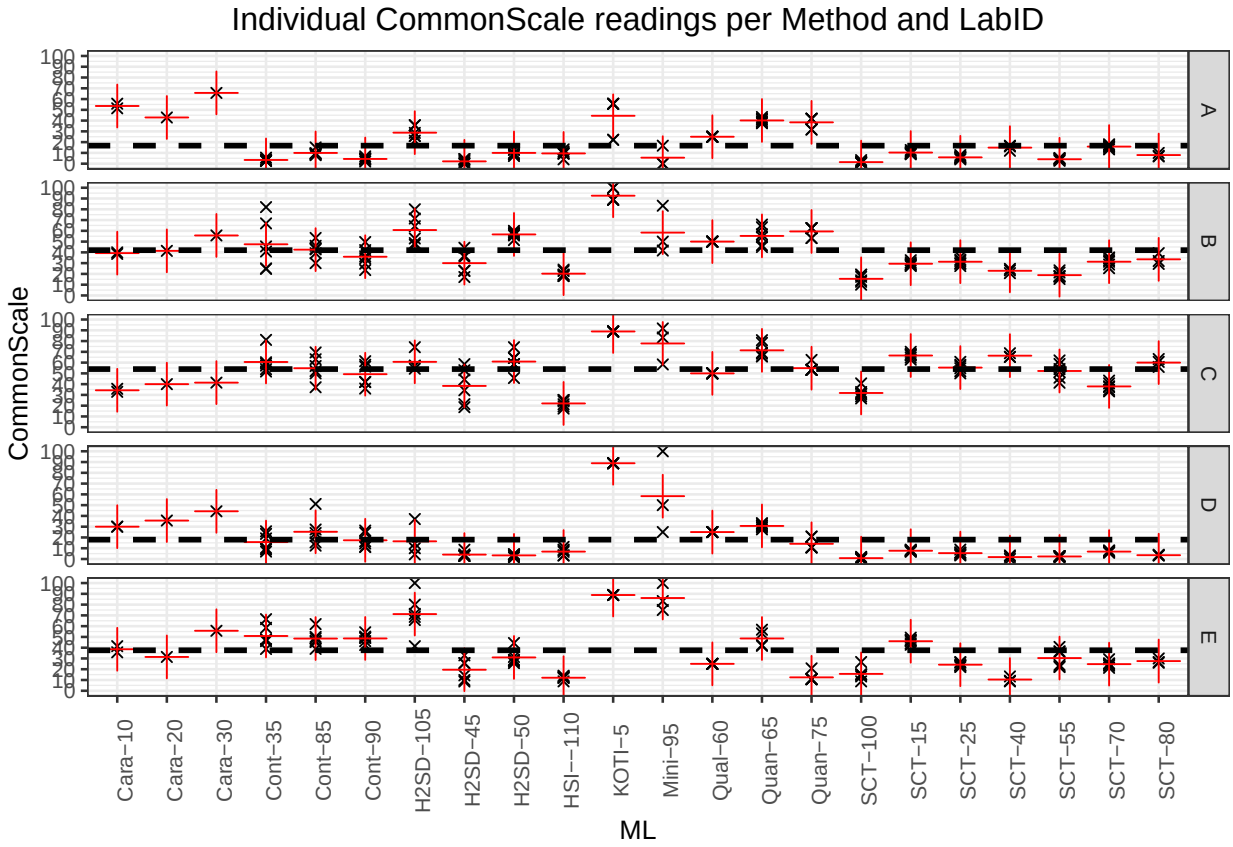
- This CommonScale approach provides results that still are cotton dependent.

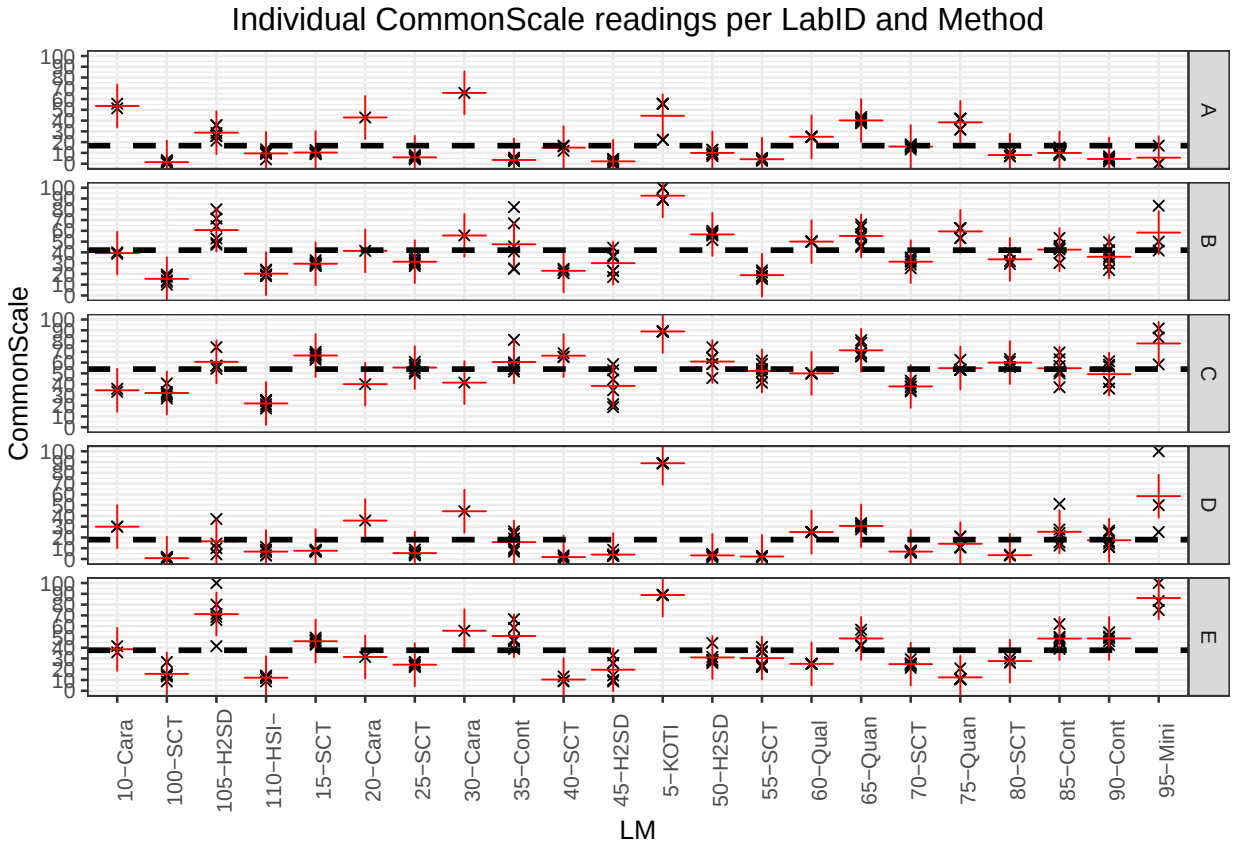
- This CommonScale approach may squeeze the scale for lower or highly stickiness contaminated cottons.

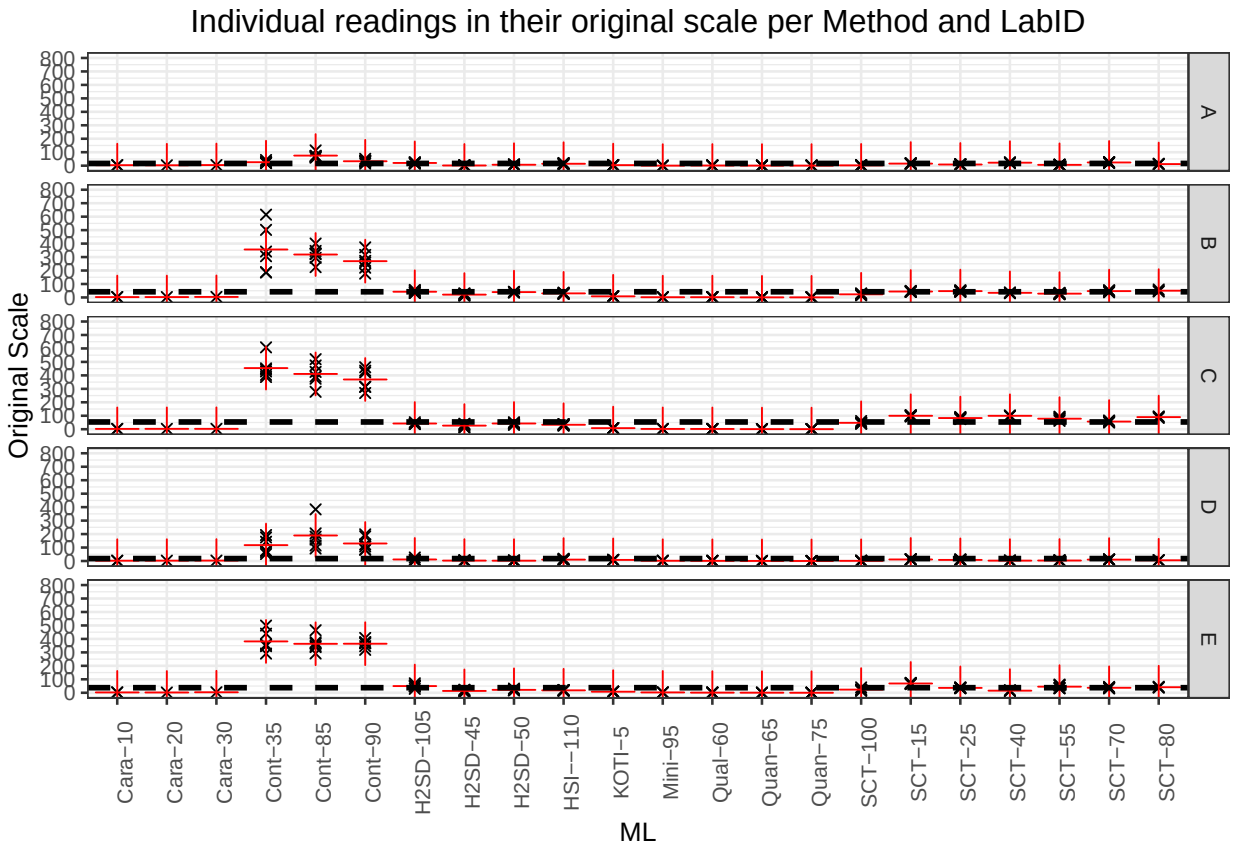
- This CommonScale approach may therefore have incidence on precision and accuracy of gained results.

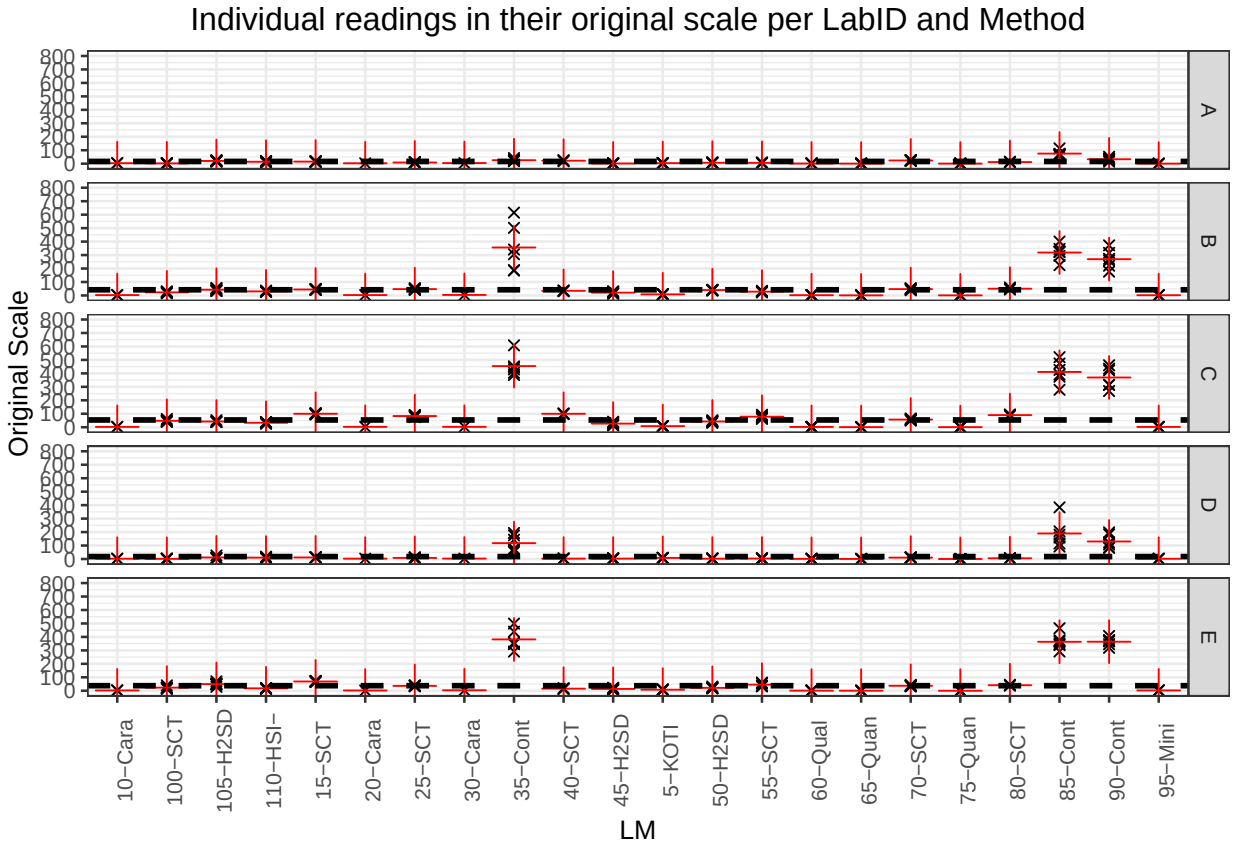
As a conclusion, as said earlier, CommonScale will be experimented at least for some round-tests in order to see if it could help Manufacturers and Users ***to get closer and closer results for each method for the same cottons over time.*** On the long run, the ability of each method to characterize stickiness ***in its strict sense*** will have to be evaluated to go further in the harmonization process; this could be by restricting some method(s) to be present in this round-test if they do not predict well enough stickiness troubles: a procedure has to be developed accordingly.

CommonScale charts


Individual CommonScale readings per Method and LabID
CommonScale
ML
A
B
C
D
E
Cara−10
Cara−20
Cara−30
Cont−35
Cont−85
Cont−90
H2SD−105
H2SD−45
H2SD−50
HSI−−110
KOTI−5
Mini−95
Qual−60
Quan−65
Quan−75
SCT−100
SCT−15
SCT−25
SCT−40
SCT−55
SCT−70
SCT−80


Individual CommonScale readings per LabID and Method
CommonScale
LM
A
B
C
D
E
10−Cara
100−SCT
105−H2SD
110−HSI−
15−SCT
20−Cara
25−SCT
30−Cara
35−Cont
40−SCT
45−H2SD
5−KOTI
50−H2SD
55−SCT
60−Qual
65−Quan
70−SCT
75−Quan
80−SCT
85−Cont
90−Cont
95−Mini


Individual readings in their original scale per Method and LabID
Original Scale
ML
A
B
C
D
E
Cara−10
Cara−20
Cara−30
Cont−35
Cont−85
Cont−90
H2SD−105
H2SD−45
H2SD−50
HSI−−110
KOTI−5
Mini−95
Qual−60
Quan−65
Quan−75
SCT−100
SCT−15
SCT−25
SCT−40
SCT−55
SCT−70
SCT−80


Individual readings in their original scale per LabID and Method
Original Scale
LM
A
B
C
D
E
10−Cara
100−SCT
105−H2SD
110−HSI−
15−SCT
20−Cara
25−SCT
30−Cara
35−Cont
40−SCT
45−H2SD
5−KOTI
50−H2SD
55−SCT
60−Qual
65−Quan
70−SCT
75−Quan
80−SCT
85−Cont
90−Cont
95−Mini

Overall statistics per Cotton and Method [8]

The following tables provide information about observed variations between results of various instruments within each method, for each of all used methods and for each and all cottons used in this round-test.

- Comparing the CVs between the lines of these tables - meaning comparing methods for each cotton - is not helpfull at all, as units used are very different between methods (so different that it has been necessary to create the CommonScale approach just displayed above to get a way of comparing results).

- However seing the evolution of these CV values over time, Method by Method, will inform about the degree of harmonization achieved for stickiness measurement. A decrease of the CV values between instruments for each Method - which is expected over time - will give indications about the degree of care taken by Laboratories and Manufacturers to harmonize results over time for their respective methods.

[8] Footnote

* NA or NaN excluded from the orginal raw data * NA appears in the following tables when less that two laboratories provided data for the given cotton and method

* Mean and Standard Deviation expressed in Unit, CV expressed in %

Mean, standard deviation and CV between instruments by method, Cotton A

Method	MeanInterLab	SdInterLab	CVInterLab	Unit
Caramelization	3.8	0.8	21.2	Color degree
Contest-S	44.6	26.6	59.7	C/F Grade
H2SD	9.6	9.6	100.4	Sticky points
HSI-NIR	14.3	NA	NA	Sticky points
KOTITI	4.0	NA	NA	KOTITI Grade
Minicard	0.2	NA	NA	ITMF Grade
Qualitative method	1.0	NA	NA	Grade
Quantitative method	0.5	0.0	3.3	Percent
SCT	13.0	8.1	62.4	Sticky points

Mean, standard deviation and CV between instruments by method, Cotton B

Method	MeanInterLab	SdInterLab	CVInterLab	Unit
Caramelization	3.2	0.6	19.6	Color degree
Contest-S	314.9	43.5	13.8	C/F Grade
H2SD	34.4	11.7	34.0	Sticky points
HSI-NIR	30.3	NA	NA	Sticky points
KOTITI	8.3	NA	NA	KOTITI Grade
Minicard	1.8	NA	NA	ITMF Grade
Qualitative method	2.0	NA	NA	Grade
Quantitative method	0.7	0.0	5.1	Percent
SCT	39.2	10.6	26.9	Sticky points

Mean, standard deviation and CV between instruments by method, Cotton C

Method	MeanInterLab	SdInterLab	CVInterLab	Unit
Caramelization	2.7	0.3	9.8	Color degree
Contest-S	411.3	42.3	10.3	C/F Grade
H2SD	37.3	9.1	24.4	Sticky points
HSI-NIR	33.2	NA	NA	Sticky points
KOTITI	8.0	NA	NA	KOTITI Grade
Minicard	2.3	NA	NA	ITMF Grade
Qualitative method	2.0	NA	NA	Grade
Quantitative method	0.8	0.1	18.5	Percent
SCT	79.3	20.3	25.6	Sticky points

Mean, standard deviation and CV between instruments by method, Cotton D

Method	MeanInterLab	SdInterLab	CVInterLab	Unit
Caramelization	2.6	0.5	19.6	Color degree
Contest-S	145.8	38.3	26.3	C/F Grade
H2SD	5.6	5.2	92.8	Sticky points
HSI-NIR	10.3	NA	NA	Sticky points
KOTITI	8.0	NA	NA	KOTITI Grade
Minicard	1.8	NA	NA	ITMF Grade
Qualitative method	1.0	NA	NA	Grade
Quantitative method	0.3	0.1	52.1	Percent
SCT	6.1	4.0	65.2	Sticky points

Mean, standard deviation and CV between instruments by method, Cotton E

Method	MeanInterLab	SdInterLab	CVInterLab	Unit
Caramelization	2.9	0.9	29.8	Color degree
Contest-S	369.9	10.1	2.7	C/F Grade
H2SD	28.4	19.0	66.9	Sticky points
HSI-NIR	18.2	NA	NA	Sticky points
KOTITI	8.0	NA	NA	KOTITI Grade
Minicard	2.6	NA	NA	ITMF Grade
Qualitative method	1.0	NA	NA	Grade
Quantitative method	0.4	0.3	83.5	Percent
SCT	38.4	17.0	44.4	Sticky points

Frequently asked questions (Q) and answers (A) [9]

Q: Correlation matrix are sometimes difficult to read due to formatting; is there any improvement possible?
A: We search for a solution, probably for next RT. Sorry for the inconvenience in the meantime.

Q: For SCT, do we have to report the number of sticky points adhering to the top and the one adhering to the bottom aluminum foils in each cell of the provided Excel sheet, or do we have to report their sum?
A: _ For SCT, please only report the sum of the counts observed on the top and bottom foils _ in each cell of the Excel sheet; thanks.

Q: Why are the cells of the Excel form locked?
A: The cells are locked to avoid modifications in the template to enable our importing system 'to know' where to get each piece of information for placing and pasting it into a devoted cell in the data base system. This saves time and secures the data in its original state (avoiding typing mistakes). So please _ make sure to use the proper Excel template: use the latest form that was sent together with the announcement of samples dispatch for sending back you results. _

Q: What 'GB/T13785-1992' stands for?
A: GB/T13785-1992 stands for a Chinese standards called 'Test method for degree of sugar contains in cotton fibers – Colorimetry'.

Q: What 'H2SD' stands for?
A: H2SD stands for High Speed Stickiness Detector.

Q: What 'HSI-NIR' stands for?
A: HSI-NIR stands for Hyper Spectral Imaging based on Near Infra-red spectra.

Q: What 'SCT' stands for?
A: SCT stands for Stickiness Cotton Thermodetector.

Q: What 'TDM-A' stands for?
A: TDM-A stands for Thermo Detection Method, and A stands for a specific scale for designing the stickiness level.

To be complemented on demand.

[9] Footnote
* Based on all round-tests carried out already.

Software components to realize this report [10]

Software code version: August 27, 2020 by Jean-Paul Gourlot

R version 4.0.2 (2020-06-22) Platform: x86_64-w64-mingw32/x64 (64-bit) Running under: Windows 10 x64 (build 18363)

Matrix products: default

locale: [1] LC_COLLATE=French_France.1252 LC_CTYPE=French_France.1252 LC_MONETARY=French_France.1252 LC_NUMERIC=C LC_TIME=French_France.1252

attached base packages: [1] grid stats graphics grDevices utils datasets methods base

other attached packages: [1] xlsx_0.6.3 xlsxjars_0.6.1 rJava_0.9-13 rmarkdown_2.3 markdown_1.1 ggplot2_3.3.2 reshape2_1.4.4 knitr_1.29 readxl_1.3.1

loaded via a namespace (and not attached): [1] Rcpp_1.0.5 highr_0.8 cellranger_1.1.0 compiler_4.0.2 pillar_1.4.6 plyr_1.8.6 tools_4.0.2 digest_0.6.25 evaluate_0.14
[10] lifecycle_0.2.0 tibble_3.0.3 gtable_0.3.0 pkgconfig_2.0.3 rlang_0.4.7 cli_2.0.2 rstudioapi_0.11 yaml_2.2.1 xfun_0.16
[19] withr_2.2.0 stringr_1.4.0 vctrs_0.3.2 glue_1.4.1 R6_2.4.1 rematch_1.0.1 fansi_0.4.1 farver_2.0.3 magrittr_1.5
[28] scales_1.1.1 ellipsis_0.3.1 htmltools_0.5.0 assertthat_0.2.1 colorspace_1.4-1 labeling_0.3 tinytex_0.25.1 stringi_1.4.6 munsell_0.5.0
[37] crayon_1.3.4

[10] Footnote
* List of all R components for processing the data

[1] “ICCTM-ITMF-RTStick 2020-1_Long_2020-08-27_Raw”

General conclusions about the results of this round-test

At this point, some general conclusions can be drawn from the results of this round-test:

- Only eight (8) methods (in past RTS, 11 methods were participating) for measuring stickiness were used;
- Twenty two (22) instruments participated to this test; maybe the current pandemic is the reason for this low participation;
- Levels of reading as well as units to express stickiness are quite different, confirming that maybe all methods are not exactly measuring the same property that all methods however name 'stickiness' by all methods, which may be a problem;
- Variations in results are quite high between laboratories using the same method, inducing somewhat low levels of reproducibility in the measurements;
- This variation seems not evolving since RT2017-1; please see last comment below;
- If one would compare methods, it would require calculating a representative result for each of the used methods; however taking care of the observed large variability levels in the results - both within laboratory and between laboratories - a mean result or a median result per method would not be meaningful at this stage. When these levels of variability will decrease, such a comparison will be published for each round-test occurrence.
- As discussed in Bremen (March 2018), since RT 2018-1, a new chapter appeared in the full report about the CommonScale approach as a first attempt of harmonization within and between methods (the later, at the condition that all methods do measure stickiness which will have to be proven according to a procedure to be developed).
- As we assume that by showing their relative position of each laboratory on comparison with others will induce corrective actions to favor more harmonized results along time, we will run other occurrences of this stickiness round-test in the coming times.
- We recommend laboratories to observe their position and deduce the potential corrective actions that will lead to more grouped results in the coming round-test occurrences.

Finally, next round-test samples will be sent in the future for the test 2020-2. Messages will be sent to the mailbox of participating laboratories contacts. We stay at disposal for any additional discussion; we do hope to see you again during the coming next RT later within the coming months.

Thank you again for your participation and support.